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CONTENTS

31 May 1990

Organization, Planning, Coordination

- Institute Director Attacks Academy Bureaucracy, Electoral System
[V. Tishkov; SOVETSKAYA KULTURA, 28 Apr 90] 1

Facilities, Manpower

- Report on General Meeting of UkSSR Academy of Sciences [PRAVDA UKRAINY, 31 Mar 90] 4
USSR Academy of Sciences Election Results, Marchuk Reelected
[K. Smirnov; IZVESTIYA, 27 Apr 90 Morning edition] 10
Academicians Criticize Academy of Sciences Elections
[V. Ginzburg, S. Novikov Interview; IZVESTIYA, 30 Apr 90 Morning edition] 11
Changes Needed in Academy of Sciences Election Procedures [S. Novikov; IZVESTIYA, 6 Apr 90] 12
USSR Academy of Sciences Elections 'Fixed' [V. Ginzburg; IZVESTIYA, 15 Apr 90] 13

Automation, Information Policy

- UkSSR Academy of Sciences Presidium Plans Super Mini Computer Project
[VISNYK AKADEMIYI NAUK UKRAYINSKOYI RSR, No 1, Jan 90] 16
Gvishiani Interview on USSR Computerization Policy
[D. M. Gvishiani Interview; SOVETSKAYA ROSSIYA, 2 Mar 90] 17
Tolstykh on Need for 'Precise' National Information Policy
[B. L. Tolstykh Interview; TEKHNIKA I NAUKA, No 2, Feb 90] 19

Patents, Inventions

- Revised Draft Law on Patents, Inventions Published [IZVESTIYA, 8 Apr 90 Morning edition] 23

Technology Transfer

- Foreign Ministry's Scientific Council Notes Goals, Policies
[Eduard Shevardnadze, E. P. Velikhov, et al.; INTERNATIONAL AFFAIRS, No 3, Mar 90] 36

Regional Issues

- Vacancies in Ukrainian Academy of Sciences [PRAVDA UKRAINY, 4 Feb 90] 64
Uzbek Central Committee Examines S&T Cadre Problem [PRAVDA VOSTOKA, 27 Feb 90] 65

Miscellaneous

- Scientists Comment on Compensation, Contract Issues [V. Dvoretzkiy; NTR TRIBUNA, 23 Feb 90] 68
Goals of Zelenograd 'Technopolis' Described [Yu. Govorukhin; OGONEK, No 10, Mar 90] 69
Ministry of Geology Indicators Reveal Perestroika Problems
[RAZVEDKA I OKHRANA NEDR, No 1, Jan 90] 73
Academy Working Group Studies Industrial Security Issues
[V. Yeremenko; NTR TRIBUNA, 23 Feb 90] 74
Technical Advertisements in NTR TRIBUNA [NTR TRIBUNA, 23 Feb 90] 75

Conferences, Expositions

- POISK Commentary on February S&T Conference
[V. Oshchenko, Ye. Ponarina; POISK, 22-28 Feb 90] 77
Conference Sets Policy for Future S&T Development
[B. Kononov; IZVESTIYA, 19 Feb 90 Morning edition] 79

Awards, Prizes

Winners of Lomonosov Prize for Physics, Natural Sciences Announced [IZVESTIYA, 21 Mar 90 Morning edition]	82
Competitive Themes for USSR State Prizes Selected [IZVESTIYA, 30 Mar 90 Morning edition]	83

Publications

'Secret' Details of Early ICBM, Nuclear Warhead Development Revealed [Ya. Golovanov; POISK, 15-21 Feb 90; 22-28 Feb 90]	87
New Textbook on Mathematical Analysis Reviewed [M. Shkil, M. Zhaldak, et al.; RADYANSKA UKRAYINA, 10 Oct 89]	91

**Institute Director Attacks Academy Bureaucracy,
Electoral System**

907A0238A Moscow SOVETSKAYA KULTURA
in Russian 28 Apr 90 p 4

[Article by V. Tishkov, director of the Institute of Ethnography of the USSR Academy of Sciences, under the rubric "Science and Society": "An Academy or a Bastion?"]

[Text] It is painful to realize, but during the years of perestroika it has not been possible to refloat the ship of Soviet academic science. It seems that there is not a sufficiently clear idea of how it is possible to do this. In the opinion of the president of the USSR Academy of Sciences ("The Right to Inquiry," PRAVDA, 5 March of this year), the whole point is that our national economy is not receptive to new ideas and developments of scientists. Another trouble lies in the shortage of investments in basic science. The leadership of the USSR Academy of Sciences is again outlining a program of reforms. G.I. Marchuk expressed at the same time concern that "the slow implementation of the entire formulated program would lead to the opposite effect: the hindrance or even the actual elimination of our basic science"(!).

The bitter truth is in actual fact concealed in this phrase: in recent years the academy has been heading namely toward such a result. And here it is a question not only of adverse external conditions. The "brainchild of Peter," the academy, which was established at one time as a "corporation" of scientists, with time developed into a colossal "ministry of science" with an intact corporate elite and a complex bureaucratic hierarchy. Today it fits with difficulty into the process of the occurring changes. And no palliative alterations of the facade, no adding on of new structures, and even the proposed introduction of a version of the "presidential board," when the president himself will select for himself a team of 11 vice presidents, are capable of saving the matter. The time of "chiefs of science" passed long ago, it, strictly speaking, also never existed, except in our deformed society.

In the past half a century scientific activity in the world, especially in the developed countries, has turned into one of the most popular occupations. Science in the West is an imposing market of ideas and creative initiatives. This is a most important sphere of investments, including state investments. And at the same time this is the individual freedom of the scientist and the scientific collective. In the world for a long time there has not been such a strict division of science into basic science, which exists on the centralized state budget, and sectorial (departmental) science, and also separate VUZ [higher educational institution] science, and all the more national ethnic science.

Today it makes sense to ponder how our West European, American, and Japanese colleagues succeeded in scoring such impressive successes without academic structures, which in our state have already been absolutized to the

level of national symbols. Here even the revival of Russia is not not conceived of without a national economy! It is necessary to say that the excessive national ethnic engagement of humanities scholars is a serious problem. A scientist cannot stand aloof of the interests of his own people, but there is also a no less sacred professional duty—it is service to science.

In foreign countries at best academies exist as scientific societies and associations on a public basis. It seems that now G. Marchuk is also inclined to this understanding when he writes that "our academy will gradually turn into a public organization." It is only that the specific actions of the academy leadership are now heading more and more often in the opposite direction. The number of presidium members has increased significantly, and now there are already about 70 of them. The number of vice presidents and the staff of assistants have been increased, the high-paid positions of deputy academician secretaries of departments for scientific organizational work have been introduced. With the transfer of a portion of the functions from the sections to the departments (within the same central apparatus) the staff of administrators in the latter has been increased, including by the "attachment" of associates from institutes. Under the presidium a number of departments have become administrations, while administrations have become main administrations, the numerous councils and commissions with obscure functions, but then sizable staffs are being retained. The party committee of the apparatus of the presidium now operates with the rights of a rayon committee.

The presidium is proclaiming only in words the need "...also to go farther along the path of the steady increase of the independence of academic institutes" (PRAVDA, 5 March of this year). All this "independence" thus far has taken the form of the unwieldy procedure, with curtsies to the ochlocracy, of the nomination (not an election!) in collectives of the executives of subdivisions and directors of institutions with subsequent election, then approval in higher instances. In turn all the basic mechanisms of the management of scientific institutions at the disposal of the presidium and its departments remained untouched. The presidium even succeeded in reaching with the government the understanding that the USSR Law on the Enterprise does not apply to scientific research institutes, but all the duties, including the tax on the increase of the wage, do apply. Now the USSR Academy of Sciences is simultaneously both a central department (ministry), if you take the status and salaries of the staff, and one large (apparently, the largest in the country) enterprise. "Individual, completely free institutes in the present system can hardly operate efficiently," Marchuk believes. And now messengers race daily from institutes to departments and administrations of the presidium in order to approve finance estimates, plans of scientific research work and their possible changes, plans of the publication of the scientific product, scientific structures, the composition of a council and officials, and the organizing committees of

conferences, to obtain "support" of every foreign business trip of scientists, to submit applications for the conducting of conferences and symposiums, for foreign business trips, and tens of other settlements, consultations, approvals, and so forth.

Now the apparatus of the presidium of the USSR Academy of Sciences is preparing for a decisive act: for the occupation of a luxurious new building, for the maintenance of which more than 600 people are required! This is a triumph of the academic bureaucracy, which has obtained during the era of democratization offices and salaries, about which the overwhelming majority of scientists did not dream. And this is when many scientific institutions, especially of the classical humanities type, are under humiliating material conditions. Scientists have become paupers during the years of perestroika: more than 60 percent of the scientific associates of our institute receive a lower wage than the average wage for the country, that is, less than 240 rubles a month.

In this situation the stubborn reluctance to give institutes independences is becoming more clear. Then the need for the existence of such immense and expensive management structures and for substantial deductions for their maintenance disappears. How is it otherwise possible to explain the intimidating statements that if institutes want to, tomorrow, if they like, they can break away from the academy and conduct independent activity. What is meant is without budget assets, but especially without the withholding of that share, which is deducted for the maintenance of the central apparatus and leadership from representatives of one or another scientific discipline or direction. But here everything is turned upside down. For the state allocates assets to the Academy of Sciences first of all for research activity which is conducted in scientific collectives. And, hence, namely the collectives are the managers of these assets, and it is first of all for scientists themselves to decide how many assets and for what functions, which they need, they can deduct for the maintenance of the apparatus and the highest scientific Areopagus.

It is time to take a sober look at the exhausting meetings of the presidium, sections, and departments, which aspire to "the supervision of science." They often have a very indirect bearing on the real movement of scientific knowledge. Reports and decisions are usually initiated "from below," for there, below, it is clearer what it is necessary to do and in what direction to move. But it is necessary to "play on the authority" of the presidium, section, or department in order to "extract" something or simply to "appear." For scientists and primary collectives are self-organizing, set up their own, including international, infrastructures, and are coordinated better and more efficiently than any bureaucratic structures which are at an unattainable height.

It is necessary to abolish as quickly as possible the procedure of "approval," which in its essence is amoral

for scientific surroundings, having left for any "governing organs" (if we cannot do without them) just the function of the "settlement" of issues. The ritual of the demonstration of power, which in many respects has become formal, lies behind this procedure. In our times the existence of a giant academic "nomenclature" is simply intolerable. But this exists! Otherwise, what is one to call the fact that the presidium, sections, and departments approve not only several hundred chairmen of councils, commissions, and committees and editors of journals, but then also their compositions and the compositions of editorial boards?

Today it is possible to preserve the viability of our Academy only on the basis of the dispersal of power and the deabsolutization of management, organizational, and especially centralist principles in the life of the scientific community. Another law on the legal bases of the scientific research organization and each scientist, as our President proposes, is not needed. It is necessary to grant the elementary right to freedom, to the honest competition of ideas and scientific results, and to independence from the excessive closeness of social ties.

Now not a law on science, which will again place in a strict framework such a complex social phenomenon, but, rather, an ethical code of norms and regulations, which would improve the intra-academic climate and would instill in it a genuine spirit of democracy and high morals, is more important. The chief scientific secretary without reason assured the presidium at one of the recent assemblies that the academy is the most democratic institution. Alas, this is not so. In no other foreign scientific community are there such an hierarchy of organizational positions and titles, cosubordination, and strong powers of some members of the occupation over others, such a pronounced stratification in incomes, and, finally, the unsightly phenomenon of the parasitization of some at the expense of others, hypocrisy, ingratiating, the absence of principles, and protectionism.

This problem is a complex one. Let us take if only the question of the corps of academicians and corresponding members, who make up about 0.5 percent of the scientific associates of the academy. This institution is evoking today the criticism of many parties, and it would be naive not to note this. But at the same time a strong historical tradition and the authority and fame as specialists and as citizens of an entire galaxy of scientists, who had these titles in the past and have them today, are behind it. But one of the problems is that with the acquisition of an academic rank a group of obviously excessive duties and expectations is "wrapped" onto an ordinary person. How many different and responsible scientific organizational positions and duties the members of the academy have!

Among foreign colleagues scientists usually engage in this work in the middle of their scientific career, and then deliberately limit the time of these duties, for their

conscientious performance requires the exertion of much effort and takes place to the detriment of their own scientific pursuits.

Today's "stars" in world science, not only in natural science, but also even in the humanities, are scientists, whose year of birth most often is in the 1940's. So what are the causes of this phenomenon, from which stagnation and the conflict of generations ensue? It is a matter not simply of the aspiration of members of the academy to usurp exclusive powers in science due to hedonistic desires for power or material considerations. Being for their most part conscientious and responsible people, they, apparently, regard as necessary the holding of administration and scientific organizational positions, including for the reason of the additional material reward they receive.

Some of them waste time, nerves, and far from good health on in many respects pointless participation in the functioning of bureaucratic structures which are becoming obsolete. Has not the time come for the purposes of improving the intra-academic atmosphere and eliminating the growing discord between the corps of academicians and the bulk of scientific personnel to specify the status of those who have the highest titles first of all as kinds of elders of the scientific community?

For the present the system of programs, competitive projects, and individual grants, which has been approved by the world experience of the development of science, is being emasculated in our deformed system. Often management personnel are again becoming the supervisors of programs, which most often are merely the duplication of entire scientific disciplines and traditional directions, as well as the recipients of the first grants. Here one ought not take an example from the members of the presidium of the USSR Academy of Sciences, who for many years now have been awarding the highest academic reward nearly exclusively to themselves. Abroad it is considered a recognized ethical norm that the presenter of grants and subsidies, prizes, or awards cannot simultaneously be their recipient as well.

It is also time to make changes in the system of election to the Academy of Sciences, which in its present form in many aspects is doing harm to normal research activity. One should if only eliminate the principle of the "self-reproduction" of the members of the academy and the possibilities of the conducting by candidates of an "election campaign."

The leadership of the academy and its full members have the opportunity to consolidate their authority in earnest, but for this it is necessary to make the choice not in favor of the bureaucrat, but in favor of the scientist.

Report on General Meeting of UkSSR Academy of Sciences*907A0232A Kiev PRAVDA UKRAINY in Russian
31 Mar 90 p 2*

[Article (RATAU): "Scientists Select the Path of Modernization. From the Session of the General Assembly of the Ukrainian SSR Academy of Sciences"; passages in boldface as published]

[Text] How fruitful was the research of scientists of the Ukrainian Academy of Sciences last year? What hindered the increase of the effectiveness of scientific research and the more extensive use of its results in practice? Along what path and on the basis of what principles is the Ukrainian SSR Academy of Sciences to be developed further? How is one to increase the contribution of science to the solution of the problems facing society? Such questions determined the content of the discussion at the session of the General Assembly of the Ukrainian SSR Academy of Sciences, which was held on 29-30 March in Kiev.

President of the Ukrainian SSR Academy of Sciences Academician B.Ye. Paton delivered the report on the activity of the Ukrainian SSR Academy of Sciences in 1989 and the Concept of its development.

The Ukrainian Academy of Sciences, like the entire republic, the speaker said, is now going through a critical moment of its history. The complex process of reassessing values and developing new, in many respects nontraditional approaches to the solution of the problems of the academy, which govern its fate in the literal sense of this word, is occurring. All of us are deeply worried by the state of science in the republic and the decline of the prestige of scientific labor.

Like other social structures, the academy was unable to avoid the ruinous influence of the administrative command system, which for decades tried to transform it into an ordinary department and science into an obedient servant, which is mainly capable only of justifying voluntaristic decisions in retrospect. But during those difficult times the academy also acted as "a disturber of the peace" and did everything possible and impossible for the increase of the level and effectiveness of basic research, the rapid use of its results, and the search for new forms of contacts of science and production. All this is now also having a positive effect on the activity of the academy and favorably distinguishes it among the other academies of the country.

However, certain deformations of the academic organism are making themselves felt and are impeding progress along the path of perestroika. Therefore, in spite of the scored successes, the necessity of profound changes, which are called upon to return to the academy the character that is worthy of the highest scientific institution of civilized society, cannot raise doubt. And this is not just another slogan, but a behest of the times themselves.

Describing the attitude of the academic community toward the draft of the Concept of the Development of the Ukrainian SSR Academy of Sciences, the speaker indicated that it was quite ambiguous. Some people, including representatives of the executive level, perceived it very nearly as a rejection of all the positive experience of the academy, which put them into close to a state of shock. On the other hand, a portion of the scientists perceived the draft as insufficiently radical.

What it is possible to say with regard to such a diversity of points of view? First of all, the appearance of our proposals does not mean at all the rejection of everything valuable that was achieved by the academy in previous decades. It is also not aimed at the dismantling of academic structures. On the contrary, the qualitative improvement of the academy and its preservation as the center of the greatest scientific authorities in the country, which is an integral feature of academies of sciences throughout the world, are envisaged. While the fact that our academy is along with this a fundamental aggregate of scientific research institutions, is regarded by many specialists in the West as a no small merit of it. This, in particular, makes it possible to organize the effective support of basic research on the part of the state.

With respect to the assertions that the draft lacks radicalism, it is necessary to bear in mind the following. Our perestroika actions should be well considered, thoroughly weighed, and cautious. Otherwise, even in striving sincerely for the modernization and democratization of the academy, it is possible to take the matter as far as the destruction of the traditional academic structures, which is intolerable.

The individual, the scientist in inseparable connection with the entire set of his problems, the president of the Ukrainian SSR Academy of Sciences stressed, has been placed at the center of the modernization of the Academy. For today the scientists of the academy are, frankly speaking, in a difficult position. The status of the scientist is now indecently low. It goes without saying that it cannot continue this way further. Therefore, the Concept is also aimed at the creation of the most favorable conditions, under which the creative individual would have real opportunities for full expression and development. This will make the academy much more attractive for talented young people, without the constant influx of whom the progress of science is impossible.

The academy should restructure its work on the principles of self-management and autonomy and be completely independent in the conducting of research, the development of the strategy and tactics of scientific activity, the settlement of questions of its arrangement, and the organization of daily life. Organs of state power and society in general need to understand that only an independent, truly autonomous academy is capable of ensuring a high level of research and of giving objective, honest, and highly competent conclusions and appraisals

on all the complex scientific, technical, and socioeconomic problems which face the republic.

In the report it was pointed out that the granting of genuine independence to institutes and scientific collectives, by the efforts of which science is directly done, is the most important direction of the modernization of the academy. All these changes are inseparable from consistent democratization and the elimination of monopolism, any manifestations of bureaucracy, and the excessive centralization of management. The pluralism of opinions should succeed the dictation of a few authorities—both real and imaginary—and the spirit of true debate should be firmly established. Only owing to this is it also possible to develop a new scale of ratings of our achievements and to elaborate new criteria of the place of the worker in the creative collective.

The modernized academy should significantly intensify its foreign relations, take a worthy place in the international scientific community, and become a real center of attraction for all Ukrainian scientists, wherever they work. It goes without saying that several issues cannot be settled by the Academy of Sciences itself. It is necessary to realize clearly that just changes within the academy in themselves will not yield the desired results. Such fundamental issues as the new status of the academy, academic autonomy, and so on should be settled in principle first of all at the legislative level in close connection with the economic and political sovereignty of the republic and with the new system of interrelations with the center.

However, we are not adhering here to an exclusively wait-and-see position. Already when beginning the work on the development of the Concept, we simultaneously also pondered over the strategy of its implementation. Three stages are visible here. The first is the drafting and adoption of the Concept itself. The second is the drafting on its basis of new charters of the academy and the institute and the statute on the department of sciences and the approval of these documents. Finally, the third stage is the work on its implementation.

Having dwelt on the results of the work in 1989, B.Ye. Paton stressed: the development of basic research, the increase of its level, and the attaining of the leading levels in world science are the main thing in the activity of the academy. It was noted that of the 15 discoveries, which were registered in the country last year, 4 belong to scientists of the Ukrainian SSR Academy of Sciences. Of course, it is impossible to plan discoveries in advance. But the fact that scientists of the republic in the past 4 years had already made 12 discoveries as compared with 3 during the entire preceding five-year plan, is an indication of a certain increase of the level of basic research in individual scientific directions. Chemists, biologists, and representatives of other fields of science scored the greatest successes last year. Social scientists also made an appreciable contribution to basic research. In particular, considerable work was done on the search for and the preparation for publication of materials which throw

light on the "blanks" of domestic history. New approaches to the further improvement of the economic mechanism as applied to the peculiarities of the economy of the republic were substantiated, a number of important aspects of its transition to economic independence were studied. At the academy a scientific center for the study of the problems of interethnic relations was established, the formulation of the interdisciplinary project "Means of the Harmonization of Interethnic Relations in the Ukrainian SSR" was begun.

Having indicated that at the present stage spiritual culture is becoming one of the decisive factors of the modernization of society, the speaker at the same time directed attention to the fact that substantial gaps exist in this important area. It is necessary to restore persistently the historical, cultural, literary, and language heritage of the Ukrainian people. Everything possible should be done to lend truly priority development to the humanities. Scientists should regain the role of the intellectual and spiritual leaders of the people and the bearers of humanistic principles.

Following the report the floor was given to Member of the Politburo of the CPSU Central Committee and First Secretary of the Ukrainian CP Central Committee V.A. Ivashko.

The Speech of V.A. Ivashko

Dear comrades!

The regular session of the General Assembly of the Ukrainian SSR Academy of Sciences is being held during a difficult and critical period. Radical changes are occurring in the economic and political systems. National self-consciousness is rapidly reviving. Spiritual life is acquiring new humanistic traits.

At the same time under the pressure of the complex situation in the country the opposition of different appraisals and views is becoming more intense, outbursts of emotions and arrogance are becoming more frequent. The lack of education and culture is having an appreciable effect.

Under these conditions the formulation and implementation of a scientifically substantiated policy, such a policy, which would conform both to the needs of the current moment and to the strategic goals and vital interests of the people, are acquiring great importance for the fates of the country and the republic. The Ukrainian CP Central Committee is proceeding from the fact that **the assurance of the real political and economic sovereignty of the republic within the modernized Soviet federation** should be the cornerstone of this policy.

Taking into account the national specificity of the processes of perestroika, the Ukrainian Communist Party intends to concentrate its efforts: **in the political sphere**—on the democratic organization of political power, the assurance of genuine government by the people, and the building of a "rule of law" state; **in the socioeconomic**

sphere—on the development of an efficient economy, which is based on the latest achievements of scientific and technical progress, the assurance of a high level of well-being of the people and the maximum social and ecological protection of people. In the spiritual sphere the party will strive for the utmost development of the culture of the Ukrainian people and all the national groups which live on the territory of the republic. The drafts of the corresponding program documents for the 28th Ukrainian CP Congress will be examined in detail at the Central Committee Plenum and will be submitted for discussion by communists and all the working people of the republic.

Comrades! The increase of the intellectual potential of the Ukrainian people is a most important prerequisite of the successful accomplishment of perestroika in the republic. And in this context the leading role belongs to scientists of the republic. For, as Ivan Franko noted, "scientific...labor proper, which in its volume and content goes beyond the narrow boundaries of utilitarianism and the soothing of current, everyday needs, is the best gauge of whether some nation can have voices and how many voices it can have in the choir of cultured nations." In the end the potential of a nation is determined not only by the average level, but also by the peaks in its social, moral, cultural, and scientific development. And in the Ukraine there were always many such peaks, which are connected with the names of many domestic giants of science and culture.

But, unfortunately, today we are forced to state another thing as well. The number of republic scientific schools, which are well known to world science, has decreased appreciably, many vivid names have faded away, and the weight of the results of scientific research has decreased. Now all of us, however it pains us to speak about this, are witnesses of the overall decline of the prestige of mental, creative labor.

Thus, thorough restructuring is also needed in science. Restructuring, which would steadily raise the prestige of Ukrainian scientists and would substantially increase their contribution to the political, economic, social, and spiritual development of the republic. In our opinion, which follows from the general trends and directions of social development, for this, first of all, it is necessary to ensure the genuine autonomy of science.

We will call a spade a spade. For a long time the relations between science and politics in our country were arranged, as they say, upside down. Movement here took place not from a scientific analysis to a political decision, but vice versa. The social sciences, as a rule, merely "substantiated" what had already been proclaimed at a regular party congress or plenum. The natural and technical sciences often also existed in the majority of cases under the conditions of being programmed for the results "needed" by ministries. We see to what this led from the example of the Chernobyl tragedy. For the "scientific"

substantiation of the location of the nuclear plant was carried out, in essence, in the interests of the corresponding departments.

Science should always fill "the order of the truth," serve only it, and in this sense be independent. That is why the Politburo of the Ukrainian Communist Party is an active supporter of autonomy in the organization of the activity of scientific collectives.

We are thoroughly convinced that the republic needs a national scientific center, which, while regarding as of paramount importance the development of all fields of science, at the same time would perform the role of an independent expert in case of the making of all political, economic, and other important decisions.

We believe that the republic Academy of Sciences can act in this capacity, but only on the condition that it really becomes an independent, autonomous public organization. Therefore, it would be advisable that the session of the General Assembly commission the presidium and leading scientists of the Academy of Sciences to draft the corresponding proposals and to submit them for consideration by the republic Supreme Soviet.

The settlement of these and many other questions, undoubtedly, requires of the republic Academy of Sciences that it also speed up its own modernization. I by no means intend to give some advice or other with respect to the specific means of the restructuring of the academy. Especially as in scientific surroundings it is possible to encounter a very broad range of opinions in this regard. So that this is entirely your affair. But one thing, in our opinion, is fundamental. The point is that the new Charter of the republic Academy of Sciences should actually bring the figure of the scientist to the forefront. That is why the comprehensive democratization of the management of science should be its core.

The analysis of world experience suggests that at the state level it is also necessary to take fairly large steps on the improvement of the management of science. The point is that in the republic it is expedient to have a state organ, which would draft proposals on the implementation of urgent financial, economic, structural, organizational, and legal reforms that are aimed at the increase of the effectiveness of science. The corresponding committee or commission of the new Ukrainian SSR Supreme Soviet could perform such functions. I would like to know the opinion of the academy in this regard.

Comrades! In accomplishing the tasks of perestroika the Ukrainian Communist Party intends to rely daily and actively on the achievements of our scientists and to cooperate closely with the Academy of Sciences, higher educational institutions, and sectorial scientific institutions of the republic. In connection with this I consider it necessary to express several views.

The first is that in the activity of scientific institutions the basic sciences now require special attention. For the lag, which has emerged in this sphere, is a step toward a

genuine crisis, moreover, not only in science. Therefore, **the priority of the development of the basic sciences** should be ensured, the amounts of assets from all sources of financing, which are used for these purposes, should be increased.

The second is that it is absolutely essential for the Academy of Sciences to determine the most promising, I would say, **"breakthrough" directions of the development of science** and to concentrate forces and assets on them. Both the very logic of the development of science and technology and the needs of social progress require this.

Take if only the following example. Frankly speaking, the republic today does not have a scientifically substantiated acceptable concept of the development of power engineering. Annually we bring in over than 57 million tons of petroleum, or more than 93 percent of its need. We have enough of our own natural gas for less than 3 months. It is necessary to take into account that brought in energy resources cost very much. With the transition to world prices we will have to pay not 30, but 68 rubles per ton of petroleum.

Therefore, today the urgent need is arising for the formulation of the optimum concept of the power supply of the national economy, which envisages both the development and extensive use of power-saving technologies and the use of various sources of power generation, including nontraditional sources. I stress, this is just one example. But how many of them are there in life?

The third. In our opinion, the state of affairs in **the social sciences** requires radical improvement. The problems of the development of the economy are the central and most urgent ones. Answers to a number of important questions are absolutely essential, for example: what should the optimum degree of decentralization of the management of the national economy of the republic be; what functions in connection with this is it necessary to transfer to republic and local organs; by what economic steps it is possible to straighten things out in the quickest manner in our own market and to ensure the protection of the interests of the republic in relations with other union republics and regions; how are we to increase the efficiency and subsequently to diversify more the forms of our economic relations, and so forth.

The complex phenomena, which are due to the democratization of social life, require thorough analysis. Now, as is known, the intensive process of redistributing the functions of power between party and state organs and various sociopolitical organizations is occurring. All this, undoubtedly, requires the use of fundamentally new approaches in the study of the political system of our society and the elaboration of the corresponding forecasts and proposals. As the experience of the work of the Congresses of USSR People's Deputies and the sessions of the USSR Supreme Soviet shows, we should also have in the republic a scientifically substantiated legislative strategy which would correspond to the specific stages of perestroika.

Significant tasks face historical science. As is known, the Ukrainian CP Central Committee came forth with the initiative on the formulation of a republic program of the development of historical research and on the improvement of the study and promotion of the history of the Ukrainian SSR. The development of the program is already being completed. In our opinion, its implementation will make it possible to coordinate the efforts of scientists of the Academy of Sciences and higher educational institutions and regional studies specialists. In general historians should increase their attention to the study of those phenomena which have great sociopolitical repercussions. Why, say, should the Academy of Sciences not hold an international conference or symposium devoted to the 500th anniversary of the emergence of the Ukrainian Cossacks? As is known, the Cossacks played a prominent role in the history of the Ukraine, the East Slavs, and many European states. I believe that this would be a significant scientific and political event.

We are attaching great importance to science in the matter of the formulation and implementation of a comprehensive program of the development of Ukrainian national culture. But, after examining this question at a meeting of the Politburo of the Ukrainian CP Central Committee, we came, unfortunately, to the distressing conclusion that thus far there is no integral, scientifically substantiated concept in this matter. This also fully concerns the concept of the restructuring in the republic of the system of public education. And we are addressing to scientists of the republic the request to devote proper attention to these questions.

The fourth. I want to direct your attention to another extremely important question—to the extreme need for the radical improvement of the ecological situation in the republic. As we know from the materials of the last session of the Ukrainian SSR Supreme Soviet, the state of affairs in this sphere is simply scandalous. And here our scientists have to do particularly much. I believe that this is a genuine social order of the people of the Ukraine.

The training of personnel, as is known, is a mandatory condition of the successful development of science. And it is necessary to approach in a new way **the education and training of talented young scientists**. Over many years a large number of appeals and slogans were proclaimed and many plans were drafted on behalf of this. But, unfortunately, no one ever fulfilled them. The Ukrainian SSR Academy of Sciences, the Ministry of Higher and Secondary Specialized Education, and other departments should, in the end, solve this problem jointly. The possibility of also enlisting in this process the Ukrainian foreign Diaspora should likewise be considered. Here it is worth pondering both over the carrying over to our institutions of advanced, including foreign, methods of work and the organization of scientific research and over the cultivation of the genuine patriotism of our scientists, first of all young people.

Here is what it is also necessary to talk about. The time has come to put an end to leveling in the evaluation of scientific labor.

Indeed, why do those, who constantly ensure high end results of research, and those, who work fruitlessly, receive practically the same wage? It is necessary for the presidium of the academy to think about forms of the stimulation of scientists who have achieved results of a world, in general high level—and first of all in the remuneration of their labor. I believe that the government of the republic would meet half-way reasonable proposals in this regard. Under the conditions of the self-management of the republic such a step is natural and possible.

And, finally, the last one—on the work of the party organizations of scientific institutions. Precisely they are called upon to promote the creation of an overall atmosphere of the free discussion and solution of all arising problems. Precisely they should be the pioneers in overcoming all the negative factors in the life of scientific collectives: the low standards of scientific debate, intolerance toward opponents, monopolism in academic surroundings, inadequate glasnost when distributing allocations, social benefits, and so on. Unfortunately, things are turning out this way far from everywhere.

The fact that in recent times the party organizations of scientific institutions have simply lost their head in face of the pressure of the undisguised attack on the party, is especially conspicuous. This, to a certain degree, is understandable. Apparently, the tolerance, tact, and disinclination to any extreme methods of fighting, which are characteristic of the scientific intelligentsia, are having an effect.

But I would like everyone to understand well: since the amendment of the wording of Articles 6 and 7 of the USSR Constitution a fundamentally new political situation has been forming. We should also organize all our work based on this. We see the modernized Ukrainian Communist Party, first of all, as an ideological community of people, intelligent, cultured, responsible people. Therefore, by the 28th CPSU Congress and the 28th Ukrainian CP Congress we must break off relations resolutely and without compromise with those, who do not wish to work in the ranks of our party and do not share the program, principled approaches to the main questions of the development of society.

Under the conditions of a multiparty system this is a very democratic process—if you do not share the ideas of Leninism and do not agree with the By-Laws of our party, find yourself such a group of people, who want to organize their life on different principles.

We are for all-round democratization, but such democratization, which is not an end in itself, but serves the development of the party and its strengthening and works for the good of our people. What is the core of the activity of whatever party you like of the world? Socio-economic policy is the core of the policy of any party, for

no one needs a party which only conducts debates on one issue or another—this is not a party, this is a club. The experience of two congresses—the Lithuanian and Estonian—raised a very important question: What did these congresses yield? Did they, perhaps, yield a new approach in socioeconomic policy, a new strategy? No, these congresses signified the breakup of each party into two parties. As the sad experience of several countries testifies, this leads to their actual departure from the arena of public life. We do not intend to take this path.

And proceeding from our responsibility for democracy, for perestroika, and for the fate of the Ukrainian state within the modernized federation, we will defend the ideological and organizational unity of the party.

In conclusion I want to say that we are firmly counting on your creative cooperation in the matter of modernizing the socialist Ukraine. On my part I want to assure you that the Ukrainian CP Central Committee will do everything necessary to aid the development of science in our republic.

The discussion, which developed at the session of the General Assembly, was pointed as never before. The state of affairs at the Ukrainian SSR Academy of Sciences and the concept of its development were at its center. The speakers expressed various opinions and made suggestions and remarks. Several points of view were traced in the pluralism of appraisals. One of them is to wait for the settlement of the question of the economic sovereignty of the Ukraine and then, with allowance made for the peculiarities of the functioning of the economy of the republic on the new principles, to formulate the concept. Academician of the Ukrainian SSR Academy of Sciences B.I. Verkin, in particular, came out in favor of such an approach:

“It is necessary to wait and to expand this document, to write it differently. A concept of what scientific directions the Ukrainian SSR Academy of Sciences will develop in the next few years in the interests of the republic, based on the possibilities, should be formulated.”

“I cannot agree with Academician of the Ukrainian SSR Academy of Sciences B.I. Verkin that we should wait and only after the political and economic future of our republic is precisely defined, proceed to the discussion of the questions of future science,” Academician P.G. Kostyuk disagreed in his statement. “And when we now discuss the concept of our development, we should pose the question more broadly and talk not only about the concept of the development of the Academy of Sciences, but also about the concept of the development of science in the republic. The academy should appeal to the new Ukrainian SSR Supreme Soviet so that an act on science would be passed when changing over to political and economic sovereignty.”

And, finally, the point of view of Academician of the Ukrainian SSR Academy of Sciences V.K. Lishko:

"I do not entirely share the opinion of B.I. Verkin about the proposed concept. In it there are sensible parts which can be developed in the future.... And if at the same time as the concept of the development of the Academy of Sciences the presidium proposed to change its leadership, it would be possible to hope that this draft, in spite of its incompleteness, is, at any rate, frank.... I do not see a reason for discussing the concept given the existing leadership. Many academicians sitting in the auditorium are, undoubtedly, talented scientists, but they cannot break away from old notions."

A number of speakers, particularly Academicians of the Ukrainian SSR Academy of Sciences V.V. Nemoshkalenko, K.B. Yatsimirskiy, G.G. Schastlivyy, and M.V. Rusanovskiy and others, did not agree with what V.K. Lishko said and criticized his statement. From the rostrum of the session the assumption was expressed that this statement is one of the proofs that today under the guise of criticism personal scores are being settled or questionable political dividends are being acquired.

The opinion that it is necessary to adopt the Concept without delay, was the leading one at the session—the overwhelming majority of speakers supported it. The adoption of the Concept, it was noted in the statements of Academicians of the Ukrainian SSR Academy of Sciences V.I. Belyayev, A.A. Sozinov, and I.R. Yukhnovskiy, Academician V.S. Mikhalevich, and others, is an urgent need, an important condition of progress both in science and in society. It is another matter that it is necessary to modify it and to specify the principles, which should be made the basis of the document, and the priorities, by which it is necessary to be guided.

"The proposed draft of the Concept of the Development of the Academy of Sciences outlines, in my opinion, movement in the correct direction," Doctor of Philosophical Sciences M.V. Popovich said.

"But its shortcomings—and here I completely agree with its critics—are the amorphism and declarative nature of a number of essential points. Of course, the concept is not a charter. But in it the questions, which should find subsequently clear organizational answers, should not remain unanswered. One of them is the status of the academy as a whole: Is this a department or a public organization?"

Academicians of the Ukrainian SSR Academy of Sciences I.I. Chebanenko and S.Ya. Braude and other discussion participants, while supporting the basic provisions of the report, were unanimous that the development of basic science should be the main direction in the activity of the academy. The subsequent achievements in this area, it was stressed in the statements, are most closely connected with the improvement of the management of science. Institutes now need significantly greater rights and freedom of actions. The separation of legislative and executive power at all levels of the hierarchical structure of the academy might be one of the means.

Here legislative power should be embodied by the scientific council, while executive power should be embodied by the board of directors. Institutes should be granted the right of the independent choice of specific forms of the implementation of executive power and the organization of internal life. In this matter it is necessary to avoid standardization.

It is clear that here the functions of the presidium as a purely executive organ will also have to be revised—in the direction of the increase of analytical and scientific methods work. The further transfer of functions of management from the presidium of the academy to institutes should occur.

It was emphasized: the development of basic research should be supported by adequate budget financing. It was proposed that assets for science be allocated in proportion to the gross volume of output, which is produced by the republic, and to increase the allocations by the redistribution of assets between the academy and departmental science, which, in the opinion of several speakers, in a number of cases does not provide anything for the future.

For, in spite of the significant increase of the total amount of budget allocations, the situation at many scientific institutions is now quite tense. This is connected, besides everything else, with the new competitive conditions of financing. As a number of speakers believe, it is necessary to do everything possible so that here under no circumstances would basic research, programs, and plans in the priority directions suffer.

The necessity of overcoming monopolism in science, it was stressed at the assembly, requires the existence of many sources of financing of research, a diversity of funds, and the assurance of the access of talented scientists to them. Glasnost is acquiring particular importance in the pursuit of financial policy. It makes it possible to prevent reproaches and complaints of injustice and subjective biases. It would be worthwhile to acquaint the scientific community in advance with the estimate of the academy, which should give a clear idea of the structure of allocations with the specification of priorities, the sources of the receipt of assets, as well as their breakdown. Academician of the Ukrainian SSR Academy of Sciences I.V. Skrypnik and other speakers proposed that the General Assembly of the Ukrainian SSR Academy of Sciences approve the breakdown of the budget of the academy.

While discussing the Concept, Academicians of the Ukrainian SSR Academy of Sciences B.I. Medovar and V.I. Shinkaruk, Doctor of Economic Sciences S.I. Doroguntsov, and others especially emphasized the necessity of the increase of the moral authority of science and its role in the life of society, the firm establishment of the leading place of the Ukrainian SSR Academy of Sciences in the achievement of the sociopolitical and socioeconomic progress of the republic, the implementation of perestroika and economic reform, the development of

Ukrainian culture, and the improvement of the well-being of the people. For this, it was stressed at the session, the necessary conditions should be created for scientists, their labor should be paid for according to its worth. It is necessary starting with the school and higher educational institution to take care of the young reinforcement of the academy and to formulate a republic program of the training of talented researchers.

The session participants devoted much attention to the participation of scientists in the solution of urgent ecological problems. In the statements of Academician of the Ukrainian SSR Academy of Sciences V.G. Baryakhtar and other speakers the necessity of taking fundamental steps on the protection of the environment, the introduction of mandatory independent ecological examination when settling questions of the construction of industrial facilities, and the development of scientific forecasting was discussed. It was proposed, in particular, to establish an institute which would supervise the implementation of the program of the elimination of the consequences of the accident at the Chernobyl Nuclear Power Plant.

Corresponding Members of the Ukrainian SSR Academy of Sciences P.S. Sokhan and P.P. Tolochko and others spoke about the crucial tasks of social scientists, particularly historians, their debts to science and social practice, and the necessity of the revival of the distinctive national culture and spirituality of the Ukrainian people. It was emphasized: the humanities should be given truly priority development, scientists should regain the role of the intellectual and spiritual leaders of the people and the bearers of humanistic principles.

The question of the interaction of the Ukrainian SSR Academy of Sciences and the USSR Academy of Sciences held an important place in the discussion. As Doctor of Physical Mathematical Sciences S.M. Ryabchenko, USSR People's Deputy and deputy chairman of the Committee of the USSR Supreme Soviet for Science, Public Education, Culture, and Training, noted, in the Concept this feature disappeared. But it is extremely necessary. For it should be taken into account that the USSR Academy of Sciences did not develop independently, it was established by all the republics. Its research potential is the property of all peoples and it is necessary to use it.

The scientists emphasized that the autonomy of the academy under the conditions of the economic sovereignty of the republic should not imply self-isolation and lead to the breaking of ties with colleagues of other scientific centers of the country, first of all the USSR Academy of Sciences. Science cannot and should not be national or regionally limited. Moreover, collaboration and fruitful scientific cooperation should be developed on not only the domestic, but also the international arena.

The discussion of the question of the means of firmly establishing the state sovereignty of the Ukrainian SSR

and the place of the Ukrainian SSR Academy of Sciences in this process was pointed. It was stressed that calls for the withdrawal of the republic from the USSR are intolerable. As Academician of the Ukrainian SSR Academy of Sciences B.G. Lazerev noted, the fact that Ukrainian physics is at the leading levels of world science is a great service of prominent scientists from Leningrad. And there are many examples of mutual assistance and internationalism in science.

The session participants approved by separate decrees the report on the activity of the Ukrainian SSR Academy of Sciences in 1989 and adopted the Concept of the Development of the Republic Academy of Sciences.

A decree on the restoration of groundlessly repressed scientists to membership in the Ukrainian SSR Academy of Sciences was adopted.

Several organizational issues were considered. Academician of the Ukrainian SSR Academy of Sciences V.G. Baryakhtar was elected vice president of the Ukrainian SSR Academy of Sciences. The academician secretaries of departments were approved: the Physics and Astronomy Department—Academician of the Ukrainian SSR Academy of Sciences M.S. Brodin; the General Biology Department—Academician of the Ukrainian SSR Academy of Sciences Yu.Yu. Gleba.

With this the session of the General Assembly of the Ukrainian SSR Academy of Sciences concluded its work.

USSR Academy of Sciences Election Results, Marchuk Reelected

907A0241A Moscow IZVESTIYA in Russian 27 Apr 90
Morning edition p 4

[Article by K. Smirnov: "The Repetition of Covered Ground? In Moscow the General Assembly of the Members of the USSR Academy of Sciences Continues"]

[Text] For the fourth day at the House of Scientists, in the Presidium of the USSR Academy of Sciences, and in other places, the general assembly of the members of the union Academy of Sciences is forming its highest organs. On 23 April the president of the USSR Academy of Sciences—Academician G. Marchuk—was elected by secret ballot (195 votes in favor, 43 opposed, 8 ballots were declared invalid), while on 25 April Vice Presidents Yu. Osipyan (194 in favor, 36 opposed), Ye. Velikhov (153-67), R. Petrov (178-52), O. Nefedov (220-13), N. Laverov (196-34), V. Kudryavtsev (215-18), A. Logunov (169-60), and K. Frolov (180-49) were elected.

Moreover, the chairmen of the Siberian and Ural Departments of the USSR Academy of Sciences, Academicians V. Koptug (179-44) and G. Mesyats (175-50), became vice presidents. The question of elevating the director of science in the Far East to the rank of vice president for the present has been deferred.

Academician D. Likhachev proposed to give the status of vice president of the USSR Academy of Sciences to the director of the Leningrad Scientific Center. Chairman of the Leningrad Scientific Center Academician Zh. Alferov was elected vice president of the Academy of Sciences by 164 votes "in favor," with 64 "opposed."

Academician I.M. Makarov was elected chief scientific secretary of the USSR Academy of Sciences (178-43).

Both the president and his vice presidential team (with the exception of Academician Zh. Alferov) and the chief scientific secretary remained the same. On the tickets for secret balloting there were no alternative candidates (the chairmen of the regional departments, as a rule, compete locally). All is quiet on "the academy's Shipka Pass."

Academicians Criticize Academy of Sciences Elections

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Morning edition p 3

[Interview with Academician V. Ginzburg and Academician S. Novikov by IZVESTIYA correspondents: "The Presidium Has Been Elected. But What Is Next?"; date not given; first four paragraphs are IZVESTIYA introduction]

[Text] On 27 April the general assembly of the members of the USSR Academy of Sciences, which elected the new leadership of the academy, concluded in Moscow. IZVESTIYA correspondents addressed a number of questions to Academicians V. Ginzburg and S. Novikov, who on the eve of the general assembly published in IZVESTIYA (Nos 105 and 96) articles on the problems of elections at the Academy of Sciences.

"To what extent, in your opinion, will the concluded general assembly of the USSR Academy of Sciences, the final one for five years, influence the change of the situation in science?"

"Why are democratic norms taking root with such difficulty at the academy—the scientific community at large is not taking part in the discussion of the candidacies of the executives of the Academy of Sciences, scientific debates have become a rarity, and so forth?"

"But is it perhaps reasonable that during our hectic times the Academy is striving to avoid drastic changes and is not rushing to implement there and then any 'revolutionary' idea in order not to 'make a mess of things'?"

Academician V. Ginzburg:

We are all familiar with the elections to the Soviets and with the debates in the Congress of People's Deputies, in the USSR Supreme Soviet, and in the Moscow City Soviet. Against this background the election of the presidium of the USSR Academy of Sciences looked, to say the least, old-fashioned. Thus, the president (true, six candidates were nominated for this post, but five withdrew), all 11 elected vice presidents, and the chief

scientific secretary were elected without alternatives on the tickets for secret balloting. None of the candidates considered it necessary to share his doubts and to evaluate in a self-critical manner his own contribution to the work of the academy. At the assembly mainly compliments and praises were heard.

I have already repeatedly voiced both in the press and at assemblies of the academy the opinion that the election of members of the presidium "without portfolio" by specialties is inexpedient. In reality all specialties are already represented as it is by the vice presidents and the academicians secretaries of the departments. Therefore, it is necessary to elect the 20 members of the presidium "without portfolio" simply from the proposed candidates by a majority of cast votes. The conducted vote by specialties, moreover, mainly a vote without alternatives, confirmed this opinion—only 12 of the 20 vacancies were filled.

Thus, about 250 academicians spent five whole days on elections almost without alternatives.

Why did the academy not take advantage of the complete freedom in elections, which has been granted it? The reason is indicated in my article. Suffice it to recall if only that the average age of academicians (and only they elect and can be elected) is now equal to 70.

It is necessary to note that in conformity with academy regulations reelections of the presidium should be held more than once in 5 years, but no less often than once in five years. Therefore, if the presidium were to work poorly, it is possible and necessary to vote it out of office ahead of schedule.

I will not try to answer the question of the tasks of the academy on a broad level—it is impossible to embrace the boundless, especially in a few lines. As to internal academic problems, the main thing is the improvement of the charter and, in particular, the procedure and rules of the election of new members of the academy. These elections should take place in conformity with the charter already this year. Therefore, the improvement of the election rules is an urgent task. Then it is necessary to establish a commission of the general assembly for amendments of the charter. It should propose means of broadening the rights of corresponding members and the role in the academy of the scientific community and all scientific associates.

Academician S. Novikov:

I would call the held general assembly purely conservative. It consolidated specific positive results of the first alternative elections of rank and file members of the presidium 1.5 years ago, in October 1988, but also consolidated, in essence, the practice without alternatives of electing the executive unit—the five presidents. The vacancies were not announced in advanced. In individual cases the very name of the position was "specially created"—for a specific person at the last moment—and thereby the existence of an alternative

was practically impossible (for example, the position of vice president simultaneously for education and for publishing activity of the USSR Academy of Sciences). In a number of cases the stagnation practice of appointing "executive-multiple machine operators," who hold many different executive positions, was continued, although in individual cases members of the assembly and the president (unfortunately, very timidly and selectively) attempted to create some restrictions.

The stand of the presidium against glasnost, which took the form of the organization of an excessively secret assembly and the refusal to admit if only as observers representatives of the institutes of the USSR Academy of Sciences, although this is also not at variance with the charter of the USSR Academy of Sciences, disappointed me most of all. I personally submitted such a proposal to the presidium a month ago. Feudalism is being adopted in science. If they are electing executives over scientists, it is necessary if only to hear them out, to let them see the election process, to let both the people and the press see it.

Moreover, the decrease of the standards in the observance of the charter of the academy when preparing the assembly distressed me. Indeed, at the annual assembly in March 1990 the powers of the presidium ended in conformity with the charter of the USSR Academy of Sciences. There was no decision of the annual assembly on the extension of the powers, but the presidium continued to function and to manage its own elections, although this was already simply a group of academicians, so to speak, according to law.

By the strange procedure of "absentee open ballot" the charter has now been amended, it is permitted to exclude from the registered staff the academicians, whom the presidium notified about the elections not more than a month ago and had itself allowed a foreign business trip. The ballots were sent to the presidium and were delivered not to the counting commission, but to the office. Where in such a procedure are the guarantees of authenticity?

The assembly was set and held in an auditorium, where there are fewer seats than members of the academy, and so on. I am afraid that such a practice will not change the situation for the better.

Nearly 50 percent of the 306 academicians are over 70, more than a third are over 75. These are distinguished veterans, who are living on past notions, which were deformed especially greatly during the period of stagnation even for people with significant services. Quite a number of them continue to wish to "supervise" younger, actively working scientists, while in so doing not questioning them and even not seeing them. The subordination of scientists to administrators in the robes of scientists and the habit of hanging onto their words, which was caused by stagnation, are also playing a negative role; the loss of the independence of examinations is a consequence of this.

Reasonable conservatism is needed, but the preservation of stagnation, the lack of glasnost, and scientific feudalism is unreasonable conservatism, in my opinion.

One cannot do without glasnost and the admission of younger scientists. They are bolder and are not accustomed to keeping quiet. Rallies are not needed in science, but the allowing of representatives to participate in the practical discussion of really important questions, such as the elections of executives of the academy, its members, and directors of institutions, is necessary. Or else here everyone knows something important and negative about someone, but everyone keeps quiet out of habit, which many old people will not longer replace with anything new.

Changes Needed in Academy of Sciences Election Procedures

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[Article by S. Novikov: "To Elect, Not Coordinate: Candidacies of Future Academy of Sciences Leaders Should be Discussed by a Broad Circle of Scientists"]

[Text] The terms of office for the USSR Academy of Sciences Presidium have expired. It is necessary to elect the president, vice-presidents, and all other members of the presidium. The uneasy moods both of Academy members and of the broad community of scientific associates are understandable. Who will these people be who are called the "scientific headquarters" of the country? Who will head the headquarters? There are no doubts that this is important. Much will depend on them. The leading strata of high politicians will view the development of science through their eyes; Soviet society will judge the level of science and of the Academy according to their intellectual level, enthusiasm, competence, and the principle-mindedness of scientific assessments and expert analysis. These people's low social opinion might decide the Academy's fate.

We all know that the outcomes of a quarter-century of evolution are highly unfavorable. The decaying influence of stagnation was also telling on the USSR Academy of Sciences, especially on its leading administrative layer. Observations and analysis lead me to conclude that the Academy's community of scientists and workers in science, from academicians to candidates of sciences, were less subject to this influence than other related communities—VUZ [higher educational institution], medical, engineering, pedagogical, agricultural, and other sciences. It seems to me that as a consequence of this the relative value of the academy for our country has grown. It has the greatest percentage of specialists working at a good international level in their field (although, alas, in a number of fields, to put it mildly, this percentage is small even here).

However, this does not relate to the administrative layer. Stagnation has cultivated a hybrid "scientist-organizer of science" of a new type, whose scientific career from a

very early stage was accompanied by work in administrative or public duties. Often, they started as "public workers" in a VUZ and in a number of cases passed their student exams and entered graduate school through highly privileged methods. Stagnation clothed them in the trappings of great scientists.

In the past, the upper administrators of science were chosen by the government from among scientists who had already achieved a high scientific level and had displayed organizational capabilities during 35-45 years. Having agreed to hold the post, many of them worked seriously, devoting all their time to this, just as they had devoted it to science before. For example, I knew academicians M.V. Keldysh and I.G. Petrovskiy very well. They suffered greatly from the fact that there was no longer time for personal work in science, no possibilities for combining it with leadership. Yet, they were brilliant scientists, as everyone knows, and they knew what it meant to work seriously in science.

The new type of organizer of science somehow imagines the process of scientific work differently, and posts just help him. From his youth, he mastered the secret mechanism of "climbing the ladder" and "making connections," while at the same time subordinates were writing works (the level of ethics is higher for those who print these works along with "executors," but several print them even without co-authors, holding their colleagues back with "an iron hand" or paying them with a career). Some such scientists—organizers of the new type—were promoted "from above," and others were promoted by scientists of the old generation as smart "fixers," pleasing both to them and to the "higher-ups." One way or another, right now a large percentage of leaders of science consist of such people. The Brezhnev apparatus with which they grew up considers them "its own scientists," the "nomenclature," and is oriented only to their opinion on everything. They are promoting the next, still lower level. This is dangerous for the country! The country may lose the remnants of serious science very quickly, if it does not investigate who stands for what on the basis of objective analysis. It should be kept in mind that the community of scientists have been subjected to this layer of "organizers" for a long time and, so to speak, ate only from their hands. Stagnation arranged everything comfortably! Therefore, right now it is not so simple to discover the true opinion of scientists from above.

Under these conditions, can the academy elect its own leadership for the first time in history? In any case, I believe that the candidates for president and for the presidium should be discussed with a broader, younger scientific community, less accustomed to silence, which will be able to do this sharply and on principle, not having the right to a decisive voice. After all, they also elect the leaders over them!

Who should the president and vice-presidents of the academy be? Scientists, by whom the country will judge the level of science in the academy, or administrators,

whose power must be strengthened? For instance, can pre-election promises to improve the standard of living play a decisive role?

Previously, the academy never elected its own president—this was done in high circles (before the revolution, by the tsarist court). Academician Ye.K. Ligachev recommended the last president in 1986, and a decade earlier—M.A. Suslov. The president recommended the vice-presidents, but everyone knew that this had been decided "from above." Even the regular members of the presidium were "coordinated." Five years ago, the then secretary of the Gorkiy Party Obkom did not "let" one great scientist into the presidium due to insufficient obedience.

We should not overlook the obvious fact that the leadership of the Academy will have to work with the USSR Presidential Council, the USSR Council of Ministers and the CPSU Central Committee Politburo, and their opinions on the candidates are very important for this work. However, they should be open and should arise as the result of analysis of discussion in the broad scientific community.

Appropriate procedures have not been drafted for the time being. They must be developed. We should not be hasty. The academy is not a government, not a ministry; it can survive for a while with a temporary administration, the more so since science must not be controlled. A hasty choice of an unsuccessful but administratively strong leadership for five years from among the number of stagnant leaders of science may contribute to the loss of the remnants of serious science and education, to the decline of the academy's scientific authority. It seems to me, we need a president and vice-presidents who will present the country with the face of the scientific community; they should not issue their statements as the opinion of a community, when they contradict it that community. The representation of power and of science should be carefully balanced in the Academy's future leadership. Let us not be hasty!

USSR Academy of Sciences Elections 'Fixed'

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Morning edition p 3

[Article by Academician V. Ginzburg, USSR people's deputy: "Academy-Style Democracy"]

[Text] On 5 April, IZVESTIYA published an article by Academician S.P. Novikov, "To Elect, Not Coordinate," calling for broad, beforehand discussions of the candidacies for USSR Academy of Sciences [AS] leaders. It should be noted that I generally agree with the content itself of S.P. Novikov's article, but I disagree with the conclusion: we must make haste, we will never get out of stagnation with endless delays.

So, we must now, within the context of an imperfect but already established procedure, elect a president and the presidium. Simultaneously at the same general meeting,

it is necessary and possible to start thinking about the future and specifically make a number of decisions, ensuring the Academy's development. Here, I will write with respect to this.

Right now, there are 306 active members (academicians) and 567 corresponding members in the USSR AS. According to data of 1 January 1990, the average age of the academicians is 69.5 years, and of them 139 are older than 70, while 106 are older than 75 years. The average age of corresponding members is 63.7 years. In the USSR Academy of Sciences (I am rounding off the figures), 220,000 people work in all, including 6,600 doctors of sciences (average age of 58.1 years), 30,000 candidates of sciences (average age of 45.6 years) and 26,700 scientific associates without a degree (average age of 38.2 years).

The academy is controlled by the presidium, which now consists of 41 people. Among the presidium members it is possible, essentially, to also include all 21 former presidium members who reached 75 years of age in 1988 and were named advisers to the presidium. So far as I know, the only difference between presidium members and these advisers lies in the fact that the latter have the right only to a consultative voice on the presidium.

In the recent past, including the last elections, the presidium was essentially appointed, since the list of candidates "was coordinated" by the so-called directive authorities. The academicians were unable to add anyone to the list, and there were no alternatives whatsoever (one person—one seat). Moreover, in practice no one is removed from the presidium. Membership in it was life-long, and attention was not directed to age or even the ability just to attend meetings. An age limit was finally introduced in 1988. Academy members over 70 years of age may become advisers to the boards of directors of USSR AS institutes with the same salary, but without the right to hold administrative posts. Presidium members should not be more than 75 years old and all who have reached this limit become advisers as mentioned above. Thus, two more hierarchical gradations appeared in the Academy. Incidentally, the status of advisers of both types is in no way fixed and, strictly speaking, is not definite (I know from my own experience: I myself at the first opportunity became an advisor to a board of directors). Let me also note that I am in principle opposed to any age qualifications—in a genuinely democratic society and in democratic organizations (secret and alternative elections, glasnost, etc.) qualifications are entirely unnecessary. However, with the situation existing in the Academy and its geriatric mindset and ways, of course, an age limit is necessary.

Only academicians can be elected presidium members, and the voters as well are only academicians. It seems to me that it is hard for a person not privy to academic ways to believe this, but it is a fact: corresponding members, although they are members of the academy, do not have the right to vote in elections of the academy's leading body. Before, they did not have the right to vote in any

elections in the departments. Only in 1963 did corresponding members receive the right to vote in academic departments, as well as to elect the department bureaus.

The division of Academy members into academicians and corresponding members in the USSR Academy of Sciences took shape historically, although such a division is rarely encountered in world practice. I think, the existence of only one type of membership is more correct, as in the U.S. National Academy of Sciences and the London King's Society, which enjoy, apparently, the greatest authority.

However, transforming the USSR AS in the appropriate spirit is a difficult and awkward job, and right now we are not up to it. Yet, it would be very simple to grant the corresponding members the right to vote in elections of the presidium and the presidium, and this step of elementary democratization long ago became imminent. Moreover, the USSR AS Commission on Changing the Statutes, of which I was a member, in preparation for the USSR AS General Assembly held in March, suggested granting corresponding members the right to vote in elections of the presidium. However, this did not happen. The presidium rejected this proposal and did not even submit it to the general assembly for a vote. Formally, it had the right to do this, since the commission on the statutes is a body of the presidium and only drafts suggestions for it. Other commission proposals were also rejected, in particular, the possibility of an alternative vote by the general assembly in the event of disagreements between the opinions of the commission and of the presidium. Thus, only the presidium's proposals were submitted to the general assembly, to be accepted or rejected. Such is academy-style democracy. Speaking at the general assembly on 22 March of this year, I announced my withdrawal from the existing presidium Commission on Changing the Statutes and suggested electing said commission in the general assembly, having made it a body of the general assembly. Of course, the presidium should have the right to introduce its own proposals on changing the statutes and related documents. However, if the proposals of the presidium and of the commission differ, they should be voted on according to an alternative basis.

Meanwhile, about voting in the academy. It is simply shameful in nature. I will not write in detail about the quality of open voting in the crowded hall, where the academicians, found in the minority and identifiable with difficulty, express their opinions by raising hands (the "headquarters of Soviet science" has no voting equipment whatsoever). Perhaps, the accepted "technique" during so-called secret voting is even more important. On the ballot there are columns or the words "elect" and "reject." However, a blank ballot (no marks whatsoever were made) or a ballot on which both columns were marked are counted as a vote "for" (!). As I understand it, this "method" was introduced by the notorious Academician Vyshinskiy (such people have "adorned" our academy: let me also recall Lysenko, Mitin and others similar to them). Readers with a pure

heart may not even understand the meaning of this trick. So, the meaning is that, given the presence on the list of only one candidate for a seat, as has always been the case in the past and is entirely possible even now, and given the absence of any voting booths, a secret vote immediately becomes obvious (it is clear that anyone who has raised his hand has voted against). In the upcoming elections, the presidium succeeded in achieving the introduction of a more or less normal system of secret voting. However, it is necessary to introduce normal secret voting in all elections in the academy (and everywhere else in the country as well). Meanwhile, the corresponding commission proposal, like a number of others, was not submitted to the general assembly by the presidium.

Proposals concerning the upcoming elections to the academy this year (elections have not been held for two years already, and postponing them to 1991 would not only be inexpedient, but would mean a direct violation of the statutes) are especially important. That is why I, strictly speaking, am writing. The serious situation in the academy (clear, in particular, from S.P. Novikov's article) was brought about by its age structure, and was characterized by the above "Academy-style democracy" and by conditions, under which elections were held in the past. True, as compared to many other organizations, to a certain extent the statutes operated and certain rules existed in the academy. However, everything not stipulated in the statutes and the resolution on elections is not prohibited. The telephone right and all sorts of machinations have functioned to their utmost. What did the granting of "special seats" cost (it was possible to elect only a predetermined candidate to such seats), and what did the arbitrary actions of the president, who gave out all sorts of "additional" vacancies like borzoi puppies, cost? In its day, the USSR Academy of Sciences Siberian Department was created, and then other departments outside Moscow. This is good work, but was accompanied by the assignment of vacancies to the USSR AS according to geography. Scientist X, suitable from the

viewpoint of leadership, promises to go to Novosibirsk, so they elect him. Yet, later some of those elected generally do not move to permanent residence in Novosibirsk, or they go there for a few years and have already become lifetime members of the Academy.

In such a situation, to me some of S.P. Novikov's wishes, although right, seem utopian. Moreover, it seems to me, he underestimates the role and value of organizers of science. Such combinations of outstanding scientific and organizational capabilities, characteristic of S.I. Vavilov, I.V. Kurchatov and M.V. Keldysh, are encountered, unfortunately, extremely rarely. In the upcoming elections to the presidium, we should do what we can to help the matter, and we should to the utmost free ourselves of personal tastes and ambitions. However, to a significant extent, I set true hope for the development of the Academy on the future elections of its members. Even if I do not see it right now, in five to six years (after three election cycles, it is expedient to hold elections once every two years) the Academy will be roughly one-third renovated, and later even more. It is necessary that the new members not be of the Stalinist-Brezhnev breed, but be worthy people in all respects (both scientifically and morally). For this, we must perfect the election system. A great deal has been written about this. The presidium commission has drafted a number of proposals on this account, but, as stated, the presidium did not submit them to the March general assembly. Meanwhile, so that elections to the Academy in 1990 are not held in the old way, but in a more improved manner, we need new rules. The only solution that I see lies in passing these rules at the general assembly at the end of April and also electing (by secret vote and on an alternative basis) a USSR Academy of Sciences Commission on Changing the Statutes. One conference is enough for all this, but, after all, five whole days will be set aside for elections of the president and the presidium. Unfortunately, many simple measures and solutions in the academy are not being made or not being passed for years. We must not tolerate this. We do not need fussiness, and our past, present and future obligate us to hurry.

UkSSR Academy of Sciences Presidium Plans Super Mini Computer Project

907A0152A Kiev VISNYK AKADEMIYI NAUK
UKRAYINSKOYI RSR in Ukrainian
No 1, Jan 90 pp 72-74

[Article: "Super Computers: A New Generation"]

[Text] *The UkSSR Academy of Sciences (AS UkSSR) Presidium examined the prospects for manufacturing and utilizing highly productive and intelligent computer systems with an active communication capability.*

Presentations were made by the deputy director of the V. M. Glushkov Institute of Cybernetics (IK) of the UkSSR Academy of Sciences, O. V. Palagin, Doctor of Technical Sciences, and by the Director General of the Science Industry Association (NPO) "Saturn", L. G. Gassanov, Doctor of Technical Sciences.

O. V. Palagin noted that many problems in the natural sciences cannot be solved using traditional methods and means of computer technology, not even using the supercomputer. Thus scientists of the IK AS UkSSR and NPO "Saturn" proposed the creation of a super minicomputer with a number of specific characteristics. The first is a similarity in architecture and electronic base to the PC; the second is modularity and expansion capability; the third is the use of an active switching environment in the general form of switching ultra high frequency (UHF) channels; and the last is intelligence.

The speaker focused on the characteristics of future computers. The similarity between this system and personal computers is the key factor indicating the feasibility of this project in the nearest future. The modularity in this case yields the possibility of constructing a number of computing systems based on single technical design which can expand and acquire a certain configuration in response to user demands. The use of UHF radio channels as an internal switching system is suggested by their high throughput capability, stability with respect to interference, and simplicity of configuration. These qualities permit realization of the principle of modularity on the switching level. The intelligence of the system, as the authors understand it, points to an effective interaction with the user and control of the computing process in regard to the compilation of information.

Aside from creating an effective organization for parallel calculations, the main scientific problems solved by this configuration are the development of new mathematical models and methods for calculating, obtaining numerical estimates of criteria for system function probability, development of the machine and system architecture, theoretical aspects of construction and use of UHF technology in computers.

Two main stages of work towards the creation of a super minicomputer were defined: 1990 - production of a small configuration experimental model, consisting of 16

modules (64 working processors), with a capacity of up to 100 million operations per second; 1992 - production of a large configuration, consisting of 256 modules (1024 working processors), with a capacity of close to 1 billion operations per second.

Co-presenter L. G. Gassanov focused on certain technical and scientific organizational elements of the development, emphasizing its perspective and high priority.

Participants in post presentation discussion were the Director General of NPO "Microprocessor", V. L. Avgustimov, doctor of technical sciences; the Head of the Vinnitsya Polytechnic Institute, O. P. Stakhov, Doctor of Technical Sciences; a Department Head of the S. P. Korolov Production Association, A. I. Slobodanyuk, Doctor of Technical Sciences; the Director of the Institute for Problems of Information Registry of the AS UkSSR, Corresponding Member of the AS UkSSR, V. V. Petrov; and the Dean of the Radio-Physics Faculty of the Kiev National University, Corresponding Member of the AS UkSSR, M. H. Nakhodkin.

Noted additionally was the necessity to follow the custom of utilizing the usual organizations and financing for new endeavors, for example, creating a regional concern for developing and producing computer models. This would attract financing from interested national departments and foreign firms, and significantly accelerate the introduction of new models and technology into production.

In his follow-up remarks, Academician B. Ye. Paton, President of the AS UkSSR, stressed that the Presidium of the AS UkSSR in the past year fairly frequently examined questions relating to informatics. (Presentations by Academician V. S. Mykhalevich, on the concept of computerization of our society, by Corresponding Member of the AS USSR A. O. Stogniya, and Corresponding Member of the AS UkSSR V. V. Petrov, on the activities of organizations headed by them, and by Professor O. P. Stakhov, on Fibonacci computers).

Now to the day's agenda - the discussion of new principles for computer construction. In essence, the discussion was about how our scientists look upon the new generation of computers. Noteworthy encouragement lies in the fact that the V. M. Glushkov Institute of Cybernetics of the AS UkSSR is developing two variants of the supercomputer. It is a question of two directions in which our scientists have superiority as yet. The direction in the cited presentations needs a deepening of knowledge and development. Not only the concept, but also the organization of work, should be up to world standards. In fact, even during the development phase, a level higher than the world standard should be the goal (in speed, capacity, and especially in reliability). All aspects of the new technology function should be analyzed, i.e. technology, noise immunity, the potential of interacting with current systems, etc. Today, only system solutions to problems and consideration of all accompanying factors can bring success.

The V. M. Glushkov Institute of Cybernetics of the AS UkSSR, and the Department of Informatics, Computer Technology and Automation of the AS UkSSR, should choose the most effective manner of work and utilize the necessary staff and technical resources. It should create an effective science and technology program, and employ the appropriate institutes of the AS UkSSR to complete it.

Academician B. Ye. Paton praised the suggestion for organizing the production using regional concerns. Further, he drew attention to the necessity to take into account the organizational changes now taking place in production areas in electronics, specifically that the production of personal computers basically will be centered in enterprises run by the Ministry of Radio Industry, while the development of the ideas will be the domain of the AS UkSSR and the Ministry of Electronics Industry.

As a result of its investigations, the Presidium of the AS UkSSR recognized the direction toward the development of intelligent multimicroprocessor systems with an active communication capability, and the creation of a super minicomputer based on them, as a priority in the Republic. It praised this evidence of cooperation between the AS UkSSR and the Ministry of Electronic Industry.

The V. M. Glushkov Institute of Cybernetics has been charged with strengthening the material, technological, and personnel resources for this work. The Institute, together with the manufacturers, is also charged with making a proposal for forming a regional concern for building the new generation supercomputers, as well as an appropriate republic wide science and technology program.

The Department of Informatics, Computer Technology and Automation of the AS UkSSR has been delegated by the Presidium of the AS UkSSR the task of determining the most effective approach for accelerating the production of the super minicomputers.

Gvishiani Interview on USSR Computerization Policy

907A0170A Moscow SOVETSKAYA ROSSIYA
in Russian 2 Mar 90 p 2

[Interview with Academician Dzherman Mikhaylovich Gvishiani, director of the All-Union Scientific Research Institute of Systems Research of the USSR Academy of Sciences, by SOVETSKAYA ROSSIYA correspondent V. Abramov, under the rubric "A Topical Interview": "There Is a Concept—There Are No Computers"; date and place not given; first three paragraphs are SOVETSKAYA ROSSIYA introduction]

[Text] It has become customary to point out how far we have fallen behind the leading countries in information science. And although they say that the informatization of society is inevitable, like the arrival of spring after

winter, this is of little consolation. Urgent steps, which would speed up "the change of seasons" and would ensure the support of the radical economic reform and the democratization of all social life, are needed.

The concept of the informatization of Soviet society was formulated recently and was approved by the Commission of the Soviet of the Union of the USSR Supreme Soviet on Questions of Transportation, Communications, and Information Science. The deputies proposed to take it as the basis in the preparation of a state program on this vital problem. The program should help legislators and the government to determine in what sectors, in what proportions, and in what dynamics to invest assets and where to send forces in order to achieve success. It would seem that a course has been outlined, it is necessary to stick to it and to pick up speed in the work. However, doubts are arising: Are the outlined reference points accurate, do they make it possible to avoid incorrect planning and financial decisions?

Academician of the USSR Academy of Sciences D. Gvishiani, director of the All-Union Scientific Research Institute of Systems Research of the USSR Academy of Sciences, one of the institutes that developed the concept, gives our correspondent answers to this and other questions, which concern the informatization of the country.

D. M. Gvishiani: The doubts are quite understandable, Dzherman Mikhaylovich said. All of us have gotten tired of the innumerable programs, plans, and projects of the century, which are often based not on what is possible, but on what is desirable and, therefore, are doomed to fail.

It is necessary to rely on a thoroughly substantiated, realistic, balanced document. I suppose that the concept does not completely satisfy these requirements, but I do not see anything terrible here. For it is not a plan that has the force of law, in which behind each line there are investments in the millions. It has completely different functions. The main thing is to make clear where we are, where it is necessary to go, and what it is necessary to do, that is, to elaborate a systems view of the problem.

Here one must not evade the realities of life, it is necessary to see clearly what it is possible to achieve in our country in the area of information science in the immediate future. We also adhered to this position when formulating the concept. The self-critical assertion that even in case of the success of the outlined steps the Soviet Union for a long time to come will lag in informatization behind the developed capitalistic countries, took the place of the customary "overtake and surpass." It is merely important that it would be possible to monitor and regulate this lag so that it would not reach catastrophic dimensions.

It is possible to argue about the reference points given by the concept, but today its very appearance is important: the offered set of views gives legislative and executive

organs a clear idea of the situation and makes it possible to avoid mistakes in long-range and current plans.

SOVETSKAYA ROSSIYA: The concept is being criticized for the fact that in it they combined what cannot be combined.... What is more correct: the centralist state "directing" of the process or reliance on public initiative? To develop all the subsectors of information science or to concentrate efforts only on those types of information products, which are competitive on the world market?

D. M. Gvishiani: And it is a good thing that they are criticizing us. This is useful for the subsequent work on the state program of informatization and on the plan of the next five-year plan. The strong and weak points of the adopted version of the concept have now become obvious. The principles, which are convincing, significant, and profound, will play the role of reference points, the others will go to the archive.

SOVETSKAYA ROSSIYA: You did not state your opinion on the indicated contradictions.

D. M. Gvishiani: As to the first remark, on the state management of the process of informatization and initiative from below, there is only an apparent contradiction here. These are two sides of the same coin. It is necessary not to confuse the actions of the "conductor" and the "musicians." Moreover, today we see one division of the tasks, tomorrow it may turn out to be different.

It is the business of the center, the government, and the organs subordinate to it to create the conditions for information development. How do we carry out the informatization of society, if we do not have, in point of fact, an advanced technical base for the latest information technologies, if communications networks are in embryo? These are the conditions. And it is possible to create them only on the basis of a weighed centralized policy.

It is another matter to actually saturate the country with computers, to supply programs and databases, to develop effective information exchange—in short, to use the conditions, which depends on the initiative of enterprises, including cooperative and joint enterprises, organizations, cities, rayons, and private individuals. If it exists, the informatization of society will begin. If it does not, centralized deliveries of equipment or the management of information activity from above will not change the situation. The number of idle computers will simply increase in the country, nothing more.

No one in the world makes computers himself "from and to." Some are strong in the element base, others are strong in assembly, still others are strong in program development. The leading electronic firms are, as a rule, international firms. And we must find our place as quickly as possible in the international division of labor, having offered a competitive commodity. And we have such a commodity—software, an intelligent product,

which makes it possible to solve a broad category of research, design, management, and other problems.

However, the revenues from the sale of software products most likely will not make it possible to cover the enormous outlays on the acquisition of computer hardware, first of all personal computers. And a conveyor line for the production of our potential commodity has not been organized, moreover, the situation, as in many other sectors, is being complicated by the inconvertibility of the ruble.

SOVETSKAYA ROSSIYA: So, will we all the same have to develop all the sectors of information science in order to make everything ourselves "from nail to frame"?

D. M. Gvishiani: Of course, we will have to create and develop specific production capacities, especially in the very backward sphere of communications. Otherwise falling out of the world communications process threatens us. It is no laughing matter—an associate of our institute orders a call to West Berlin, while they offer him a connection in a day! About what scientific or business cooperation is it possible to speak?

The main thing now is that competent people would engage in planning—where and how much to invest. Otherwise it is easy to ruin the matter. Unfortunately, we have already seen many examples—now a plant, which is intended for second-rate technology, is built, now the stamping of obsolete unreliable computers is begun....

There is another reason, for which the assets being allocated are sinking like water into sand. We are to this day stubbornly trying to make ourselves everything that already exists in the West. And while we mechanically copy the achievements of others, other countries, by uniting efforts, are developing new generations of electronic equipment. By continuing the policy of imitativeness, we risk remaining forever on the shoulder of the roads of world information development.

If we develop a polytechnical information industry, we should develop such a one, which is capable of making a technological breakthrough and offering a completely new product. The revenues from its sale will help to patch the holes in other spheres that are not developed at all in our country. And Soviet scientists do have promising ideas—in the area of artificial intelligence, for example.

SOVETSKAYA ROSSIYA: The concept gives an idea of the future of informatization, but says nothing about what it is possible to expect in the immediate future.

D. M. Gvishiani: One must not precisely expect. Everyone, who is capable of making some contribution to this process, needs to set to work immediately. Unfortunately, we have thus far not learned to stimulate organizations and people, who are prepared to make information services available: databases, the leasing of computer time, communications channels. The completely irresponsible attitude toward the legal aspect of

the matter and toward the protection of intellectual property is greatly hindering the matter.

Another striking manifestation of incompetence is the distribution of microprocessor equipment, which has been purchased by the state, among departments and enterprises like imported shoes or sets of furniture. A little to everyone, so that no one would left offended. But whereas with consumer good it is possible if only to understand such a method, with respect to computers it looks like complete nonsense. As a result at many plants in the office of the chief engineer a couple of personal computers gather dust, while one ought to have supplied one enterprise, but completely—the one, which is prepared for informatization, sees its advantage, has trained personnel, and agrees with expenditures on training, software, and the creation of databases.

Precisely such information cells, "strong points"—plants, higher educational institutions, hospitals, municipal services—can become standard prototypes and the basis of universal informatization. It is necessary to revise immediately the faulty system of distribution, to allow enthusiastic enterprises to purchase machines from those who do not need them, and to use information equipment as a means of support of the new economic mechanisms.

Incidentally, similar mistakes were made due to the lack of a concept of the informatization of society and the scientific analysis of decisions. The criticism of the recently developed version of the program and the attempts to response to the criticism are already a qualitatively new level, which reflects the aspiration of the country for informatization. If only we do not get held up at the start! Very little time remains for the formation of the assignments on information science in the next five-year plan, but the theoretical disputes, without which one cannot elaborate specific decisions, are still far from over....

SOVETSKAYA ROSSIYA: Can there be different versions of the priority steps?

D. M. Gvishiani: Of course. And they are connected in many respects with the differences of the economic models of the development of the country, which are competing today. Strict centralized planning, for example, in practice does not need informatization. Why should a plant know where it is more advantageous to get raw materials, if it depends entirely on a specific supplier who has been "appointed" by the center?

The fear of losing their influence is inciting departments to the establishment of large enterprises to the detriment of small ones, which, as world experience shows, are more efficient. It is easier to manage 1 clumsy monster than 10 dynamic units. And the State Committee for Computer Technology and Information Science did not refrain from the temptation to attach to the plan of the five-year plan a system of software factories, although it is well aware that far less will come from them than from small collectives of programmers.

SOVETSKAYA ROSSIYA: What does your institute propose?

D. M. Gvishiani: There is an acute shortage of electronic equipment in the country, but one must not throw all the assets into its independent development or purchases abroad. It is necessary on a broad scale to create databases, knowledge bases, and local and regional computer networks, to develop various software products, and to train skilled personnel. The invested assets will begin to be recovered quickly as soon as a sufficient amount of computer hardware appears.

Is it necessary to try to convince anyone that a computer is advantageous only when it works for the needs of people? The computerization of the social sphere will help to reduce the most substantial losses which our country continues to incur—the losses connected with the human factor. The sharp intensification of education on the basis of personal computers will give society specialists of a qualitatively new level. The supply of medicine with new information and computer hardware will increase immeasurably the effectiveness of the prevention of diseases and will make it possible to prolong hundreds of thousands of lives. In municipal services it will also be possible to solve a large number of problems: from effective monitoring in trade to the allocation of housing and the organization of personal services....

We are focusing attention on this, thinking first of all about the future. First, informatization should be aimed at the solution of major, socially significant problems of the development of society. And, second, the bulk of people should realize the advantages of information science and overcome the psychological barrier in dealing with computer hardware. It is necessary to change the quality of life. The informatization of the social sphere will help to do this.

The same process in the sphere of physical production, of course, should be carried out in a no less resolute and thought out manner. However, here industrial enterprises should themselves become the full-fledged managers of the resources they have, should themselves pose problems, and should select independently the most effective means of their solution.

Tolstykh on Need for 'Precise' National Information Policy

907A0171A Moscow *TEKHNIKA I NAUKA* in Russian
No 2, Feb 90 pp 4-6

[Interview with Chairman of the USSR State Committee for Computer Technology and Information Science Boris Leontyevich Tolstykh, by A. Afanasyev, under the rubric "A Topical Interview": "One Must Not Lose Heart," Chairman of the USSR State Committee for Computer Technology and Information Science B. Tolstykh Is Convinced"; date and place not given]

[Text] *TEKHNIKA I NAUKA:* Boris Leontyevich, could you to start with tell a little about the committee, which

you have been commissioned to head—about its functions and about who works here?

B. L. Tolstykh: In my understanding the main task of the committee today is the formulation of an effective state policy in the area of the informatization of Soviet society. It is necessary to specify and substantiate scientifically the directions and means, so that the development of the country would proceed at the level of the leading countries of the world community. For a lag can have the result that we will begin to talk with the developed world in different languages. Therefore, the formulation of a high-quality state policy requires the most serious scientific study. This should be not simply the view of office personnel or individuals, but the great collective work of scientists and specialists both in the field of development and in the field of production. There often exists the opinion that in general there is no need to be concerned with some sort of policy and prospect, but it is necessary to accomplish specific practical tasks. I cannot agree with this. Unfortunately, I have to state that today our country does not have a precisely formulated policy of the informatization of society. Now we are involving more and more scientists and specialists so that if only its first preliminary version would appear. I even believe that it will not and, besides, cannot be ideal. Life does not stand still. World trends change, new technical achievements and a new understanding of various problems appear. We do not yet realize and know something, therefore, even though these will be details, it is necessary today to develop the first version and to continue tomorrow to turn out a new one, which should be updated regularly.

Today in the committee there are a little more than 400 staff members. I have not made serious replacements, we are getting acquainted and are getting adjusted to each other. I cannot say that there are no skilled personnel here, I sense that there are intelligent, worthy people, but too little time has passed yet for any serious appraisals. Perhaps, this period of adjustment will last to the end of the year. For the work is taking place not only in the committee—I have to become acquainted with subordinate collectives and with other enterprises. As things progress I will also familiarize myself with the approaches, methods, and results of the activity of the central staff. I will not hide it—we have many differences in the understanding of how one task or another is accomplished and how interaction is realized. But I do not want to say that I possess the truth in the last instance, it is simply that thus far we are not a collective of like-minded people, all the relations have not been adjusted here, and due to this there are many unjustified complications and many errors. At this stage we are operating by the method of open discussions and are holding workers' meetings. The priority blocks of problems have already been distinguished. We discuss them and see, we give everyone an opportunity to voice how he understands them. Initially the central staff takes part, but if we see that we are getting ripe for the making of a decision, we involve subordinate scientific institutions.

TEKHNIKA I NAUKA: Computer technology is a most important factor, which governs the level of scientific and technical progress. I will venture to assume that specifically for our country this factor is decisive to an even greater degree than prestigious space research. How do you evaluate the state of affairs in this area from two positions, first, versus the average world level and, second, from the standpoint of the prospects of development, taking into account the capabilities of the production and scientific base and the training of personnel?

B. L. Tolstykh: The spread of computer technology became possible owing to the development of electronics, the informatization of society is possible only on the basis of its computerization. Therefore, microelectronics and computer technology are, of course, primary. Machines ensure the development of informatization—they make a calculation, control processes, and automate the handling of information flows. For informatization is also the organization of global, mass flows of information and information services of the most diverse nature—from the simplest reference services, like train schedules, to commercial services, the automation of the labor of designers and scientific personnel, and the dissemination of new knowledge.

TEKHNIKA I NAUKA: In either event, does a direct dependence exist—the higher the level of development of computer technology is, the greater the effectiveness of informatization will be?

B. L. Tolstykh: There is such a dependence. The revolutionary significance of the personal computer consists in the fact that it provided an individual mode of work, made it possible to save time, and increased labor productivity. But today this is just part of the task, if you examine it from the standpoint of obtaining the final impact. Today another, no less important part of the task is to ensure the interaction of the personal computer and the person working with it not only with their local closed database, but also with an entire network. If I have a computer, you have a computer, and we are linked by a network, we have a twofold advantage, while if you and I are not alone, if there are many of us—people with different interests, who have different knowledge, our computers are hooked up to a common network and have access to a large computer, which stores an enormous file of data, and in a few seconds we can get any information that interests us, imagine how much we gain? Here is the essence of the matter. Now, after all, other adjacent areas—communication equipment, various types of communications—have achieved such development that opportunities have appeared to integrate all this hardware and to provide remote subscribers with any information practically instantaneously. Within a region, within a giant country, within the international community. Imagine that at this minute you can instantaneously access a data bank in some country, which contains information that interests you, well, say, on the latest technology or on the methods of treating diseases. Here from any country it is possible to obtain just as quickly any information that is stored in

your data bank. The interest in the mutual exchange of information is very great. And in many cities of the world what are called "teleports"—large complexes which by means of the latest hardware organize enormous flows of the most diverse information—are already operating. Only superintegrated systems are capable of such a task. Will one computer really accomplish it?

TEKHNIKA I NAUKA: Certainly not, but all the same how close are we to what you talked about?

B. L. Tolstykh: We, of course, are at the very start of the path. The lag is a very large one. There are the general problems which perestroika has revealed—these are both the inability to work and the imperfection of the economic mechanism. Today the state is forced to allocate the basic resources for the solution of such most urgent priority problems as the supply of the country with food and consumer goods. Under such conditions particularly many problems, which are hard to solve, are arising. Our sector requires large outlays: there are not enough production capacities. It is necessary to improve substantially the development and to increase by several fold the output of computer hardware, but the trouble is that the available production capacities in the same microelectronics are not entirely suitable for the support of modern production, which requires, for example, special ultraclean premises, which in old buildings it is practically impossible to equip. While you know quite well how new plants are built in our country....

But one must not lose heart. It is necessary to formulate a policy, to outline realistic goals, and, of course, to work persistently. For it is possible to propose tempting, but groundless plans. Such a thing has already happened more than once. Therefore, we must compare everything with the real possibilities. We are proceeding from the fact that as a number of urgent problems are solved in the country, opportunities will appear also to increase the efforts in the area of informatization. Now the corresponding concept has been prepared on the basis of the competitive version.

The concept is the heart of state policy. It provides reference points and substantiates the position of the country both inside and within the framework of international cooperation. For example, how is one to stimulate computerization? Is one to bring in foreign-made computers, attracting with preferential taxation or eliminating it altogether, or, on the contrary, to rely only on domestic production, increasing the custom taxes? Here is one to use imported components in place of scarce domestic ones or again count on their internal production, in order not to become dependent in the future? Is one to establish joint ventures for the production of computer hardware, advanced switching stations, and communicators or strive for their production independently? The view can be different.

TEKHNIKA I NAUKA: That is, does there exist at present a package of questions, to which it is necessary to find the optimum versions of the answers?

B. L. Tolstykh: Quite correct. The prepared concept also answers these questions.

TEKHNIKA I NAUKA: What sectors of the national economy, in your opinion, first of all need informatization?

B. L. Tolstykh: Before answering this question, I would like to say that the USSR State Committee for Computer Technology and Information Science does not produce computer hardware, enterprises of other ministries produce it. We deal for the most part with questions of the coordination of the efforts of the country in the area of informatization—here there are also enough of its own difficulties. I consider the information service of the population a very important sector. Matters here are bad—there are practically no home computers, good software is lacking. It is well known that we adapt much, and here difficult legal questions are arising. For programming is a very specific and important area, to which the value of computer hardware is transferred. In our country, unfortunately, neither a demand nor opportunities for the development of good programs for the population have formed yet. Development tools are needed for their production, while for this, in turn, hardware of a higher level than that of the user is needed.

Or here in our country the process of the computerization of the school is taking place, it is taking place poorly, the government assignments are not being completely fulfilled, we do not always understand all the importance of this question. There are people, including in the educational system, who believe that computerization in the school is being carried out only so that children would have an idea of what a computer is—they would know its arrangement and the fundamentals of programming. This is not entirely so. Having graduated from school or having taken a computer education course, the pupil should acquire a new quality, he should become aware that he cannot work, make decisions, and live without a computer.

I do not know a sector, in which informatization would not yield a positive impact, but, taking into account our present capabilities, I am thoroughly convinced that the informatization of the school should be carried out to the detriment of any other tasks. The school is in first place, and even the higher educational institution is after it! A start has been made. Computer classes and clubs have been set up. Educated, capable people are managing them. Now it is necessary to see to it that everywhere they would understand and accept this. There is also the problem of the instruction of teachers. And if equipment has gotten into the school, if they have made it work, it is necessary to make this work as efficient as possible.

At the first meeting of the collegium of the Committee with my participation precisely the problems of the computerization of the school were examined. The situation here is complicated, there are very few good school computers. Several steps were outlined. It is necessary to introduce new, advanced methods of evaluations of

hardware and elements of independence examination and to develop for enterprises, which support the computerization of instruction, a system of benefits and taxes, which stimulate the quality, reliability, and advantages of some types or others of means of the computerization of the school, which are being developed. The independence of enterprises is being developed. It is good that they are developing newer and newer models of computers, but the models are different, and, therefore, an objective evaluation, which is conducted not by managers, but by special councils, in which scientists, interested individuals, and users should together with specialists of industry evaluate different models of computers and grant the producers of the best of them benefits, say, with respect to the deduction from the profit and taxation, should be carried out. While a higher tax should be established for machines which are technical worse. It is necessary to prepare and to apply more boldly new economic methods of the stimulation of the quality of computers.

TEKHNIKA I NAUKA: It is well known that the Coordinating Committee for East-West Trade Policy has lifted the restriction on the delivery to our country of a number of models of personal computers. What is the possibility of the saturation of a portion of our market with imported machines?

B. L. Tolstykh: If we were rich enough and we did not have foreign currency problems, I would consider that it is necessary to buy a sufficient number of computers and to deliver them to schools. I am a supporter of bulk purchasing, but today under the conditions, which have formed in the country, the priority of bulk purchasing belongs to consumer goods. Therefore, the establishment of joint ventures is, in my opinion, promising. We will support such a direction.

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**Revised Draft Law on Patents, Inventions
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[Draft of the Law of the Union of Soviet Socialist
Republics "On Invention in the USSR"]

[Text] This Law in conformity with the USSR Constitution specifies the economic, organizational, and legal bases of invention activity in the USSR and is aimed at the stimulation of invention for the purposes of the socioeconomic development of the country.

I. The Organization of Invention Activity in the USSR

Article 1. The Enterprise and Invention Activity

The state, cooperative, or other public enterprise, institution, and organization (hereinafter the enterprise) create the necessary conditions for the development of invention creativity and the use of inventions in production (the establishment for workers of an individual work schedule for the period of the development and the preparation for use of inventions, the introduction for these purposes of special positions, the granting of creative leaves, the provision of premises, equipment, tools, materials, information, and other things necessary for this work).

For the performance of patent and licensing work the enterprise organizes a patent services and provides the utmost assistance to the activity of public organizations of inventors.

Article 2. Organs of the State Management of Invention

1. The USSR State Committee for Science and Technology carries out the supervision of the work on the development of invention activity in the country.

The State Committee for Inventions and Discoveries attached to the USSR State Committee for Science and Technology (Goskomizobreteniy) pursues the unified state policy in the area of invention, accepts for consideration applications for inventions, conducts an examination on them, issues patents, within its competence monitors the observance of legislation on invention activity and generalizes the practice of its implementation, gives methods assistance to the patent services of ministries, departments, and enterprises, as well as to public organizations of inventors, ensures the training of patent experts, performs patent information work, and carries out the state certification of patent agents.

2. Ministries, state committees, and departments of the USSR, the Councils of Ministers of the union republics, and the executive committees of Soviets of People's Deputies when formulating and implementing technical policy aim invention activity at the increase of production efficiency and the quality and competitive ability of products and provide for the necessary financial, material, and technical resources for these purposes.

Article 3. Public Organizations and Invention Activity

The All-Union Society of Inventors and Efficiency Experts, engineering and scientific and technical societies, and other public organizations provide inventors with organizational, material, technical, and other assistance, as well as assist inventors in the protection of their rights and legal interests.

II. The Invention and Its Legal Protection

Article 4. The Demands on an Invention

1. Legal protection is granted to an invention, if it is new, is of an inventive level, and is industrially applicable.

An invention is new, if its essence is not known from the level of technology. The level of technology as applied to a claimed solution is determined according to all types of information, which are accessible in the USSR or foreign countries before the date of priority.

An invention is of an inventive level, if its essence for a specialist does not follow clearly from the level of technology.

An invention is industrially applicable, if it can be used in industry, agriculture, health care, and other sectors of the national economy of the country at present or in the future.

2. A device, a method (including a biotechnological method, methods of treatment, diagnosis, and prevention), a substance (including a chemical and medicinal substance), a strain of a microorganism, cultures of plant and animal cells, as well as the use of a previously known device, method, substance, and strain for a new purpose can be objects of inventions.

3. There are not recognized as inventions:

- scientific theories
- methods of the organization and management of the economy
- symbols, schedules, rules
- methods of the performance of mental operations
- algorithms and programs for computers
- designs and diagrams of the layout of structures, building, territories
- proposals, which concern only the appearance of items and are aimed at meeting esthetic needs.

4. Inventions, which contain information, the divulgence of which might do harm to the state interests of the country, should be classified.

The procedure of handling such inventions is determined by the USSR Council of Ministers.

The author, the enterprise, the public organization, and organs of state management are obliged to take the necessary steps on the prevention of the divulgence of information about these inventions.

Article 5. Authorship of an Invention

1. The right of authorship of an invention belongs to the citizen who developed the invention.
2. If several citizens jointly participated in the development of an invention, all of them are considered the coauthors of such an invention.
3. Citizens, who did not make a personal creative contribution to the development of the invention, gave the author only technical, organizational, or material assistance, or contributed to the official registration of the rights to the invention and to the use of the invention in production, are not recognized as coauthors.
4. The procedure of the exercise of the rights, which belong to the coauthors of an invention, is specified by an agreement among them. Organs of state authority and management, enterprises, and officials should not interfere in the exercise by them of these rights.
5. The right of authorship of an invention is an incontrovertible and inalienable personal right.

Article 6. The Legal Protection of an Invention

1. The right to an invention is protected by the state and is attested by a patent.
2. The patent for an invention certifies the recognition of the claimed solution as an invention, the authorship of the invention, the priority of the invention, and the exclusive right to the use of the invention.
3. The patent for an invention is valid for 20 years, counting from the date of receipt of the application by Goskomizobreteniy.
4. The extent of the legal protection, which is granted by the patent, is governed by the formula of the invention. The description and drawings serve only for the interpretation of the formula of the invention.
5. The force of a patent, which has been issued for a method of obtaining a product, also applies to the product (including a plant or a breed of animal), which was directly obtained by this method.

Here the new product is considered to have been obtained by the patented method in the absence of evidence to the contrary.

6. Legal protection as inventions is not granted to solutions, which are at variance with public interests and with the principles of humaneness and morality, as well as are clearly useless.
7. The legal protection of discoveries, production prototypes, trademarks, and new strains of plants and breeds of animals, which have been obtained by the methods of traditional selection, is realized by the corresponding legislation.

Article 7. The Patentee

1. The patent for an invention is issued to:
 - the author of the invention
 - the citizen or legal person (on the condition of his consent), who was indicated by the author of the invention in the application for the issuing of a patent or in the declaration, which was submitted to Goskomizobreteniy prior to the entry of the invention in the USSR State Register of Inventions
 - the heir of the author of the invention
 - the USSR State Fund of Inventions, if the exclusive right to the use of the invention is transferred in accordance with established procedure to the state.
2. The patent for an invention is issued to an enterprise, if the appropriate contract has been concluded between the worker and the enterprise. This contract, along with the cession of the right to the receipt of the patent, specifies the duties of the enterprise on the provision of conditions of a material, production, and social nature, which are necessary for the efficient creative activity of the worker, and on the payment to him in case of the development of an invention of the reward that is stipulated by this Law. The contract is concluded with respect to inventions, which are developed at the enterprise as a result of the accomplishment of specific tasks in conformity with the assignments, which are issued to the worker and are confirmed by documentation of the enterprise. The author of such an invention has the right to a nonexclusive free license.

If the indicated contract has not been concluded between the worker and the enterprise, the patent is issued to the author of the invention. The enterprise has the right to use this invention on the terms that are specified by the agreement with the author-patentee.

3. The citizen or legal person, to whom the right to the patent has passed in conformity with this Law, can be the patentee.

Article 8. The Exclusive Right to the Use of an Invention

1. The exclusive right to the use of an invention belongs to the patentee.
2. The exclusive right to the use of an invention grants the patentee the right to use the invention at his own discretion, as well as to prohibit the use of the invention in cases that are at variance with this Law.

No one can use an invention, for which a patent has been issued, without the consent of the patentee.

The patentee should exercise the rights, which are granted by the patent, without detriment to the interests of the state and society.

3. The unauthorized production, use, importation, offer for sale, sale, and other introduction into economic circulation of a product, which was made on the basis of

a patented invention, as well as the use of a method, which is protected by a patent, are recognized as a violation of the rights of the patentee.

Article 9. Actions Which Are Not Recognized as a Violation of the Exclusive Right to the Use of an Invention

There are not recognized as a violation of the exclusive right to the use of an invention:

- the use of means, which contain inventions that are protected by patents, on board deep-sea or river vessels of other countries, in the hull of a vessel, in machines, rigging, mechanisms, and other equipment, when these vessels are in USSR waters temporarily or by chance, on the condition that the indicated means are used exclusively for the needs of the vessel
- the use of means, which contain inventions that are protected by patents, in the design or during the operation of air, space, or ground means of transportation of other countries or auxiliary equipment for these means, when the indicated means of transportation are on USSR territory temporarily or by chance.

The indicated actions are not recognized as a violation of the exclusive right to the use of an invention, if the deep-sea or river vessels, the air, space, or ground means of transportation belong to citizens or legal persons of countries that grant the same rights to citizens and legal persons of the USSR;

the conducting of a scientific study or experiment on a means which contains an invention that is protected by a patent;

the one-time production of drugs at drugstores in accordance with the prescriptions of a physician;

the use of means, which contain inventions that are protected by patents, under extraordinary circumstances (natural disasters, major accidents, catastrophes);

other cases of the use of means, which contain inventions that are protected by patents, if these means have been legally introduced into economic circulation.

Article 10. The Right of Previous Use

Any citizen or legal person, who before the date of priority of an invention, which is protected by a patent, and independent of its holder developed and used a solution, which is identical to the invention, or made the preparations necessary for this, retains the right to its subsequent free use.

Article 11. The Application for the Issuing of a Patent for an Invention

1. The application for the issuing of a patent for an invention (hereinafter called the application for an invention) is submitted to Goskomizobreteniy:

- the author of the invention, including in case of the solicitation of an patent in the name of the USSR State Fund of Inventions
- the enterprise when the conditions, which are stipulated by the first paragraph of Point 2 of Article 7 of this Law, exist
- the citizen or legal person, to whom the author or enterprise will transfer its right to the submission of the application or to whom it has passed in conformity with the legislation on inheritance.

A USSR citizen or a Soviet enterprise can transfer to a foreign citizen or legal person the right to the submission of an application for an invention, if after its appeal to Goskomizobreteniy the denial of such a transfer does not follow.

2. If the conditions, which are stipulated by the first paragraph of Point 2 of Article 7 of this Law, exist, the administration of the enterprise within 3 months from the date of its notification by the author of the invention developed by him does not submit an application for the invention, the author has the right to submit the application and to receive the patent in his own name.

3. Foreign citizens and persons without citizenship, who reside outside the USSR, or foreign legal persons, who have permanent location in foreign countries, or their patent agents conduct in the USSR business on the obtaining of patents for inventions and their keeping in force through the USSR Chamber of Commerce and Industry and other Soviet patent agents.

4. The application for an invention should pertain to one invention or a group of inventions, which are so interconnected that they form a single inventive idea (the requirement of the unity of an invention).

5. The application for an invention should contain:

- a claim for the issuing of a patent with an indication of the author (coauthors) of the invention and the applicant, as well as their places of residence and locations
- a description of the invention
- the formula of the invention, which is based entirely on the description
- drawing and other explanatory, if they are necessary
- an abstract
- a document on the payment of the duty.

The documents of the application are submitted in Russian or another language. If the documents of the application are submitted in another language, their translation in Russian is appended to the application.

Article 12. The Transfer of the Right to the Submission of an Application for an Invention, the Cession of the Patent and the Rights Which Follow From the Patent

The right to submit an application for an invention, the patent, and the right to use an invention, which follows from the patent, can be transferred under contract to a citizen or legal person. The contract on the cession of a

patent or the issuing of a license is registered in Goskomizobreteniy, without which it is considered invalid.

Article 13. The Priority of an Invention

1. The priority of an invention is established in accordance with the date of receipt by Goskomizobreteniy of the application, which contains the claim for the issuing of a patent, the description and formula of the invention, and drawings and other explanatory materials, if they are necessary.

2. The priority of an invention can be established in accordance with the date of the submission of the first application for the invention in a foreign country, which is a party to the Paris Convention on the Protection of Industrial Property (convention priority), if in Goskomizobreteniy the application for the invention was received within 12 months of the indicated date.

If due to circumstances, which do not depend on the applicant, the application with the solicitation of convention priority could not be submitted in the indicated period, the latter can be extended, but not by more than two months.

The applicant, who wishes to exercise the right of convention priority, is obliged to indicate this when submitting the application for an invention or within two months of the date of the submission of the application with the attachment of the necessary documents, which confirm the legitimacy of such a demand, or to submit these documents no later than three months from the date of the submission of the application to Goskomizobreteniy.

Article 14. The Grace Period for the Disclosure of Information Pertaining to an Invention

The public disclosure of information, which pertains to an invention, by the applicant (author) or another person, who has received access to this information, is not recognized as a circumstance which affects the patentability of the invention, if the application for an invention is submitted no later than 12 months from the date of disclosure.

The duty to prove the existence of the right to a grace period is placed on the applicant (author).

Article 15. The Publication of the Application for an Invention

1. The publication of information on an application for an invention, including the formula of the invention, is accomplished in the official bulletin of Goskomizobreteniy after the lapse of 18 months from the date of priority.

On the request of the applicant the publication of information on the application can be carried out prior to this date.

After publication any person can familiarize himself with the materials of an application. The publication of information on an application is not carried out, if before the expiration of the deadline of publication with respect to this application a decision on the issuing of a patent has been made or it has been revoked by the applicant. The publication on applications for inventions and on issued patents is not carried out when such publication can do harm to state interests.

2. The author of an invention has the right to refuse to be mentioned in published information on an application, except for instances when the author and the applicant are the same person.

Article 16. The Examination of an Application for an Invention

1. The examination of an application for an invention is conducted by Goskomizobreteniy and includes a preliminary and patent examination.

The applicant has the right on his own initiative or by invitation of a state patent expert to participate personally or through his own representative in the consideration of questions that arise during the preliminary and patent examination.

2. During the period of the examination of the application for an invention the applicant has the right on his own initiative or at request to supplement, specify, or correct the materials of the application with changing the essence of the invention.

If the supplementary materials change the essence of the claimed invention, they are not accepted for consideration and can be drawn up by the applicant as an independent application with the establishment of priority in accordance with the date of their receipt by Goskomizobreteniy.

The additional materials at the request of the expert commission should be submitted within two months from the date of receipt of the request of the expert commission. If there is a request of the applicant on the extension of the deadline of the submission of a response to the request, the deadline of the conducting of the examination is extended accordingly. If the applicant has violated the indicated deadline or has left the request of the expert commission unanswered, the application for the invention is considered rejected.

3. In case of the violation of the requirements of Point 4 of Article 11 of this Law the applicant has the right to submit the withdrawn application (applications) within the indicated period from the date of receipt by him of the notification on this violation. The indicated period can be extended at the request of the applicant.

An application, which has been withdrawn on the initiative of the applicant, should be submitted before the making of the decision of the patent expert commission on the original application.

If the withdrawn application (applications) was submitted during the established period and does not change the essence of the claimed invention as compared with the content of the initial application, the priority of the original application is established in accordance with the withdrawn application.

In case of the failure to fulfill the indicated conditions for a withdrawn application the priority is established in accordance with the date of its receipt.

4. Before the giving of the decision of the expert commission the application can be revoked at the request of the applicant. Production in accordance with a revoked application is halted. In this case the application is not returned to the applicant.

Article 17. The Preliminary Examination of an Application for an Invention

1. The preliminary examination of an application for an invention is conducted within a month from the date of its receipt by Goskomizobreteniy.

2. During the conducting of the preliminary examination the presence of the documents, which are contained in the application for the invention, is checked and the question of whether the claimed invention belongs to objects, which are protected by this Law, is considered.

If necessary the applicant can be ordered to make revisions in the application within two months after the receipt by him of the request. In this case the deadline for the conducting of the examination is extended accordingly. If the necessary revisions are not made in the established time, while the documents, which were lacking on the date of receipt of the application for an invention, have also not been submitted, the application is considered rejected, about which the applicant is notified.

3. In case of the acceptance of an application for an invention for consideration the applicant is notified about the establishment of the priority of the invention. Temporary legal protection is granted to a claimed invention from the date of publication of the application to the date of registration of the invention in the USSR State Register of Inventions. Temporary legal protection is considered not to have commenced, if a decision on the refusal to issue a patent has been made.

4. In case of disagreement with the decision of the preliminary examination on the rejection of an application for an invention the applicant within 2 months from the date of receipt of such a decision has the right to appeal it in Goskomizobreteniy.

Goskomizobreteniy makes the final decision on the complaint of the applicant within a month from the day of its receipt.

Article 18. The Patent Examination of an Application for an Invention

1. The patent examination of an application for an invention is conducted upon completion of the preliminary examination.

During the patent examination the patentability of the invention is checked.

In case of the establishment of the novelty of a claimed invention the submitted applications and inventions, which have been recognized in the USSR, all the same are taken into account from the date of priority regardless of the date of the publication of information about them.

2. In case of the failure of the applicant to fulfill the requirements on the withdrawal of one of the claimed inventions in case of the violation of the unity of an invention (Point 4 of Article 11 of this Law) the patent examination is conducted only with respect to one solution which is indicated first in the formula of the invention.

3. The patent examination should be conducted within 12 months after the completion of the preliminary examination.

The deadline of the conducting of the examination on the most complex applications for inventions can be extended by Goskomizobreteniy.

4. The change of the formula of an invention on the initiative of the applicant is allowed without the broadening of the scope of legal protection within six months from the date of receipt of the application by Goskomizobreteniy. In this case the deadline of the conducting of the patent examination is extended accordingly.

5. In accordance with the results of the patent examination Goskomizobreteniy makes a decision on the issuing of or the refusal to issue a patent.

In case of the disagreement of the applicant with the decision of the patent expert commission he has the right within three months from the day of receipt of the decision to address to Goskomizobreteniy a petition for the conducting of a reexamination within the scope of the formula of the invention.

A duty is not collected for the submission of a petition for the conducting of a reexamination.

The reexamination is conducted within three months from the day of receipt of the petition of the applicant.

6. If in the process of the examination it is established that identical inventions have the same date of priority, with the consent of the applicants (authors) one patent is issued to them.

In case of the failure to get consent a patent for the invention is not issued until the settlement of the issue in the USSR Patent Court.

7. The applicant of an invention has the right to familiarize himself with the materials that are used during the conducting of the examination.

Copies of the materials, which are opposed to the application, can be demanded within two months from the date of receipt of the decision on the application.

8. Before the entry of an invention in the USSR State Register of Inventions Goskomizobreteniy has the right to review the decision on an application, if circumstances preventing the issuing of a patent have been established.

Article 19. The Appeal of a Decision on an Application for an Invention

1. In case of disagreement with the decision of the patent expert commission the applicant has the right within 3 months from the day of receipt of the decision or the copies demanded by him of the materials, which were opposed to the application, to submit a justified objection to the Appellate Council of Patent Examination attached to Goskomizobreteniy. The objection should be considered within 6 months from the day of its receipt. The applicant has the right to participate personally or through his own representative in the consideration of his objection.

2. The decision of the Appellate Council of Patent Examination attached to Goskomizobreteniy (hereinafter the Appellate Council) can be appealed by the applicant to the USSR Patent Court within 1 year from the day of its adoption.

Article 20. The Publication of Information on the Issuing of a Patent

Goskomizobreteniy within 6 months from the data of registration of an invention in the USSR State Register of Inventions publishes information on the issuing of a patent. The author of the invention, the patentee, the name and formula of the invention, and other necessary information, which is determined by Goskomizobreteniy, are indicated in the published information on the issuing of a patent.

Article 21. The Issuing of a Patent

The issuing of a patent is carried out by Goskomizobreteniy after the entry of the invention in the USSR State Register of Inventions.

Goskomizobreteniy issues to the author of the invention, who is not the patentee, a certificate which confirms his authorship.

Article 22. The Recognition of a Patent as Invalid

1. The patent for an invention during the entire period of its validity can be recognized as invalid in full or in part in cases of:

- the illegitimate issuing of the patent due to the violation of the requirements of the patentability of the invention, which are established by this Law

- the incorrect indication in the patent of the author (coauthor) of the invention or the patentee.

2. Any citizen or legal person within 6 months from the data of publication of information on the issuing of a patent can submit an objection against the issuing of a patent to the Appellate Council owing to the violation of the requirements of the patentability of the invention, which are established by this Law.

The objection against the issuing of a patent should be reviewed within 3 months from the date of its receipt. The person who submitted the objection, as well as the patentee can participate in its review.

3. After 6 months from the date of publication of information on the issuing of a patent or in case of disagreement with the decision made by the Appellate Council for the indicated reasons, the appeal of the issued patent is carried out in the USSR Patent Court.

Article 23. Duties

1. Duties are collected for the submission of an application for an invention, the conducting of an examination, the issuing of a patent, its keeping in force, as well as the performance of other legally significant actions which are connected with the patent. The list of actions, for the performance of which duties are collected, the amounts and the times of the payment of the duties, as well as the grounds for exemption from the payment of the duties, the reduction of their amounts, or the return of the duties are established by the USSR Council of Ministers.

2. The duties are paid by the applicant, the patentee, as well as any citizen or legal person, who is interested in the performance of the actions which are stipulated in Point 1 of this article.

3. By agreement with the author of the invention enterprises and citizens can pay the duties in full or in part.

4. In case of the submission by the author of an application, which contains the request to issue the patent to the USSR State Fund of Inventions, the duties for the submission of the application and the conducting of an examination are not collected.

In the case when the patent, which belongs to the author, is transferred to the USSR State Fund of Inventions, the expenses, which have been incurred by the author in connection with the payment of duties for the performance of legally significant actions prior to the issuing of the patent, are reimbursed to him in full by the USSR State Fund of Inventions.

5. In the case when the patent is issued to the USSR State Fund of Inventions, the duties for its issuing and keeping in force, as well as for the performance subsequently of other legally significant actions are not paid.

Article 24. The Early Termination of the Validity of a Patent

The validity of patent is terminated early:

- on the basis of the request of the patentee, which has been submitted to Goskomizobreteniy
- in case of the failure to pay at the established time the annual duty for keeping the patent in force
- in case of the recognition of the patent as invalid.

Article 25. The Patenting of an Invention in Foreign Countries

1. A USSR citizen, a Soviet enterprise, and the USSR State Fund of Inventions have the right to patent an invention in foreign countries.

2. Before the submission of an application for an invention to foreign countries the applicant is obliged to submit for this invention an application to the USSR and to report in Goskomizobreteniy the intentions to patent the invention in foreign countries. In the case of the absence of a ban within three months from the date of receipt of the indicated report an application for an invention can be submitted to foreign countries.

Goskomizobreteniy can in necessary cases permit the patenting of an invention in foreign countries before the submission of an application for it in the USSR.

3. The applicant bears the expenses which are connected with the patenting of an invention in foreign countries. Credit of the USSR Bank for Foreign Economic Relations can be issued to the applicant for their payment.

The expenditures on patenting can be made by interested enterprises, ministries, and departments, Goskomizobreteniy and other state committees, public organizations, and funds.

III. The Economic Mechanism of the Use of Inventions in the National Economy

Article 26. The Economic Principles of the Use of Inventions

The economic principles of the use of inventions in the national economy are:

- the recognition of the patent and the property rights, which follow from it, as a commodity
- the extension of cost accounting relations to the area of invention activity for the purposes of increasing the mutual interest of inventors, enterprises, and society in the extensive use of inventions in the national economy of the country.

Article 27. The Use of an Invention

1. The introduction in economic circulation of a product, which was produced on the basis of a patented invention, as well as the use of a method, which is protected by a patent, is recognized as the use of an invention.

A product is recognized as having been produced on the basis of a patented invention, while a method, which is protected by a patent, is recognized as having been used, if every feature, which is included in an independent point of the formula of the invention, or a feature equivalent to it has been used in it.

2. The interrelations on the use of an invention, the patent for which belongs to several people, are governed by an agreement among them. In the absence of an agreement each of them has the right to use the invention at his own discretion, except for the granting of an exclusive or sole license, as well as the cession of the patent.

3. The use of an invention, the patent for which has been issued to the USSR State Fund of Inventions, is carried out by USSR citizens and Soviet enterprises on the basis of a concluded contract.

4. A USSR citizen, a Soviet enterprise, or the USSR State Fund of Inventions, which is the holder of a patent for an invention, which was issued in the USSR, has the right to cede to foreign citizens or legal persons a patent or to transfer the right to the use of an invention, if within 3 months from the day of the appeal to Goskomizobreteniy a justified rejection of the indicated cession or transfer does not follow.

Article 28. The Licensing Agreement

1. In accordance with the licensing agreement the patentee (the licensor) is obliged to transfer the right to the use of an invention to another person (the licensee), while the latter assumes the obligation to make to the licensor the payments specified by the agreement and to perform other actions that are stipulated by the agreement.

The licensing agreement is concluded in the form of an exclusive, sole, or nonexclusive license. The assets of the fund for the development of production, science, and technology or of other funds of similar purpose, if a state enterprise acts as the licensee, serve as the source of license payments.

If an invention is used in a scientific and technical product, which has been manufactured by the organization-patentee under contract with a client, the right to the use of the invention is transferred to him on a license basis.

2. In case of an exclusive license all the property rights, which follow from the patent, are transferred to the licensee for the term of validity of the agreement; in case of a sole license the exclusive right to the use of the invention within the limits stipulated by the agreement is transferred, with the reservation for the licensor of the right to the use of the invention in the area that is not transferred to the licensee; in case of a nonexclusive license the right to the use of the invention in his own production within the limits stipulated by the agreement is transferred.

3. If the patentee cannot use the invention in connection with the fact that another invention, which was patented by another citizen or legal person, is used in it, he has the right to demand from the latter the granting of a nonexclusive license for this invention.

Article 29. The Open License

The patentee can submit to Goskomizobreteniy for official publication a statement on the granting to any person of the right to the use of the invention (an open license), in this case the duty for keeping the patent in force is reduced by 50 percent as of the day of the publication of such a statement.

A person, who has expressed the wish to use the indicated invention, is obliged to conclude with the patentee a contract on payments.

Article 30. The Mandatory and Compulsory License. The Redemption of a Patent

1. In case of the refusal of the patentee or the holder of an exclusive or sole license to conclude an agreement on the granting of a nonexclusive license for the use of an invention to an enterprise, which needs it for the fulfillment of a state order, the USSR State Committee for Science and Technology can make the decision on the granting to the indicated enterprise of a mandatory license with the establishment of the limits of the use of the invention and the amount, time, and procedure of payments.

The indicated procedure is not applied to foreign citizens or legal persons.

2. If the use of an invention on USSR territory is not carried out properly within five years from the date of the entry of the invention in the USSR State Register of Inventions, after this time a person, who wishes to use the invention, in case of the impossibility of concluding a licensing agreement with the patentee can petition the USSR Patent Court for the granting to him of a compulsory license with the indication of the limits of the use of the invention and the amount, time, and procedure of payments.

3. In the case when an invention is of particularly great importance for the state, but it is not possible to reach with the patentee an agreement on the cession of the patent or on the issuing of a license, on the decision of the USSR Council of Ministers the patent for the invention can be redeemed in a compulsory manner with the one-time payment to the patentee of monetary compensation.

Article 31. The Liability as to Property for the Infringement of a Patent

1. Any citizen or legal person, who uses a patented invention at variance with this Law, is considered an infringer of the patent.

2. By demand of the patentee the infringement of the patent should be halted with his compensation for the losses incurred as a result of the illegal use of the invention.

The profit (revenue), which exceeds these losses, is confiscated for the state budget.

Claims against the infringer of a patent can also be lodged by the holder of an exclusive or sole license, if the patentee within two months from the day of the establishment of the fact of an infringement of the patent has not taken proper steps against its infringer.

Article 32. The Use of a Claimed Invention During the Period of Effect of Its Temporary Legal Protection

1. During the period of effect of temporary legal protection the applicant has the right to use the claimed invention, if such use does not violate the rights which follow from valid patents.

2. A citizen or legal person, who uses a claimed invention during the period of effect of its temporary legal protection, pays the patentee monetary compensation after the receipt of a patent for the invention. The amount of compensation is specified by an agreement of the parties.

Article 33. The Centralized Selection of Inventions

Goskomizobreteniy annually identifies with the participation of the appropriate ministries and departments the inventions which are of great national economic importance.

The objects of new equipment and technology, in which during the corresponding planning period the selected inventions should be implemented, on the suggestion of the USSR State Committee for Science and Technology are included in accordance with established procedure in state orders.

Article 34. The Determination of the Share of the Economic Impact From the Use of an Invention

The enterprise, which manufactured equipment (a product) or uses a technology (method), which contain an invention, with the participation of the consumer and the author (at his request) determines in the total economic impact the share of the impact that is derived due to the use of this invention. The indicated share is taken into account in case of calculations of the profit (revenue) of the enterprise, which is derived from the use of the invention, in case of the determination of the amount of the reward for the authors and the people, who contributed to the development and use of the invention, as well as in case of the establishment of tax breaks.

Article 35. The State Stimulation of the Use of an Invention

1. The profit (revenue) and currency receipts, which are derived by the enterprise-patentee from the use of an

invention in its own production, as well as from the sale of a license for it, are not subject to taxation and deduction for the superior organ for five years from the date of entry of the invention in the USSR State Register of Inventions.

2. The profit (revenue) and currency receipts, which are derived by an enterprise from the use of an invention as a result of the purchase of a license, are not subject to taxation and deduction for the superior organ for 5 years from the date of the conclusion of the contract on the acquisition of a license.

3. By decision of the USSR Council of Ministers the periods, which are indicated in Points 1 and 2 of this article, can be extended with respect to inventions, which are of great national economic importance and require a longer time for their assimilation in production.

4. The assets, which are left at the disposal of enterprises due to the breaks on taxation and deductions for the superior organ and are indicated in Points 1 and 2 of this article, are spent by the enterprises on the increase of the technical level of production, the social development of labor collectives, and the stimulation of invention activity.

The indicated assets, less the sums intended for the payment of the reward to the author of the invention and the people, who contributed to its development and use, as well as the deductions for the USSR State Fund of Inventions, are channeled into the fund for the development of production, science, and technology, the social development fund, or other funds of similar purpose.

5. The payment of taxes and the deductions for the superior organ are not made from the profit (revenue) and currency receipts of the enterprise or new works, which is established specially for the production of new equipment on the basis of a patented invention, for 5 years from the date of the placement of the enterprise or new works into operation.

The assets, which are allocated for the establishment of such an enterprise or new works by interested enterprises and USSR citizens, are exempt from taxation.

6. The saving of allocations in accordance with the estimate, which has been derived by a budget-carried organization from the use of inventions, as well as the revenues from licensing agreements for three years from the date of entry of the invention in the USSR State Register of Inventions or the conclusion of a contract on the acquisition by it of a license are left entirely at the disposal of the budget-carried organization and are allocated for the development and stimulation of invention activity.

7. Enterprises, which are using inventions or are carrying out the preparation of production for their use, have the right to obtain bank credit on preferential terms.

Article 36. The State Order for the Development and Delivery of New Equipment Which Contains an Invention

1. The enterprise, which has received a state order for the development and delivery of new equipment and technology and the placement into operation of production capacities and facilities of the ecological, nature conservation, and social spheres, which contain inventions, are supplied with the centrally distributed material, technical, and financial resources, which are necessary for the fulfillment of the order.

2. In case of the issuing to an enterprise of a state order for the production of equipment with the use of inventions, the patents for which belong to other enterprises or citizens, as well as to foreign patentees, the organ, which issued the state order, ensures the acquisition of the rights to the use of the inventions and the allocation of the financial assets necessary for this.

Article 37. The Financing of Invention Activity at the Enterprise and at the Budget-Carried Organization

1. The financing of invention activity at an enterprise, with the exception of the payment of the reward to the authors of inventions and to the people, who contributed to their development and use, is carried out at the expense of the assets of the fund for the development of production, science, and technology or other funds of similar purpose.

In case of a shortage of the corresponding assets the credits of banks, the assets of centralized funds, and, in necessary instances, budget allocations can be attracted.

The budget-carried organization, which does not form economic stimulation funds, carries out the financing of invention activity by means of the saving (revenues) from the use of inventions, which is left at its disposal in conformity with Point 6 of Article 35 of this Law, as well as credits of the bank, the centralized funds of ministries and departments, and, in necessary instances, budget allocations.

2. The expenditures of an enterprise on the development and use of inventions in its own production, the effective impact from which does not take the form of a profit or revenue (labor safety regulations and labor safety techniques, nature conservation measures, the reduction of the sick rate, and so forth), as well as on the payment of rewards to the authors of inventions and to the people, who contributed to the development and use of such inventions, are attributed to the production cost.

3. The assets for the payment of rewards to the authors of inventions and to the people, who contributed to their development and use, are allocated from the profit (revenue) of the enterprise, which was derived from the use of an invention in its own production, and from the receipts from the sale of licenses (before their distribution) and are channeled in the incentive fund of invention activity. The assets of this fund are not included in

the unified fund for the remuneration of labor and are not taken into account in case of its standardized formation.

4. The income of citizens, which is allocated by them as contributions for the development of invention activity at enterprises and at budget-carried organizations, is exempt from taxation.

Article 38. Regional Funds of the Financing of Invention Activity

1. For the purposes of the financial support of the development and assimilation of objects of new equipment, which contain inventions, the Soviets of People's Deputies can establish regional funds of the financing of scientific and technical developments on the basis of inventions.

The assets of local budgets and the contributions of enterprises, public organizations, and citizens can be the source of the formation of these funds. The indicated funds, which operate in conformity with their charters and on the terms of full cost accounting, independently establish the procedure and terms of the granting of credits.

2. The income of citizens and the profit (revenues) of enterprises, which are channeled by them as contributions into regional funds of the financing of scientific and technical developments on the basis of inventions, are not subject to taxation.

Article 39. Innovation Funds and Banks

Innovation funds and banks promote the development of invention and the extensive application of scientific and technical developments and carry out on a contractual basis the extension of credit to enterprises, temporary creative collectives, and individual authors for the development and the use in the national economy of inventions.

Article 40. The USSR State Fund of Inventions

The USSR State Fund of Inventions exercises the rights and duties of a patentee with respect to inventions, the exclusive right to the use of which has been transferred in accordance with established procedure to the state.

The USSR State Fund of Inventions promotes the development of invention in the country, by financing the development of inventions in the priority directions of the development of science and technology, instruction in invention creativity and patent studies, and the provision of assistance to inventors in the conducting of an experimental check of the technical solutions developed by them.

The USSR State Fund of Inventions conducts its activity by means of the assets, which are received in accordance with contracts with USSR citizens and Soviet enterprises, in the amount of not less than 16 percent of the annual profit (the corresponding part of the revenue)

from the use of inventions, the patents for which belong to the USSR State Fund of Inventions; the revenues from the sale of licenses for inventions, which belong to the USSR State Fund of Inventions, to foreign citizens or legal persons; voluntary contributions of enterprises and citizens, as well as assets of the state budget.

The revenues of enterprises and the income of citizens, which are channeled as contributions into the USSR State Fund of Inventions, are not subject to taxation.

The USSR State Fund of Inventions conducts its activity on the basis of a Charter, which is approved by the USSR Council of Ministers.

Article 41. The Reward for the Use of an Invention to an Author Who Is Not the Patentee

1. The reward to the author for the use of an invention, the patent for which has been issued to a Soviet enterprise, is paid by this enterprise. In those instances, when the application for the issuing of a patent for an invention is submitted on behalf of several enterprises, the reward is paid to the author by each enterprise which uses the invention, if a different procedure is not stipulated by an agreement.

2. The reward to the author of an invention, the patent for which has been issued to the USSR State Fund of Inventions, is paid by the USSR State Fund of Inventions in the amount of not less than 15 percent of the annual profit (the corresponding part of the revenue), which is derived by enterprises and citizens from the use of the invention, and the revenues from the sale of licenses to foreign citizens and legal persons for this invention.

3. The reward for the use of an invention during the term of effect of the patent is paid to the author in the amount of not less than 15 percent of the profit (the corresponding part of the revenue), which is derived annually by the enterprise from its use, as well as not less than 15 percent of the receipts from the sale of a license without the restriction of the maximum amount of the reward. The percentage is determined by the enterprise by agreement with the author.

4. The reward for the use of an invention, the effective impact from which does not take the form of a profit or revenue, is paid by the enterprise in the amount of not less than 1.5 percent of the share of the cost of the product (operations and services), for which this invention accounts.

5. The reward is paid to the author no later than three months after the end of the year, during which the invention was used, and no later than three months after the receipt of the proceeds from the sale of a license.

6. In case of the sale in foreign countries of an invention, the patent for which was issued to a Soviet enterprise or the USSR State Fund of Inventions, including in case of

the sale of licenses and the delivery of products for export, the reward is paid to the author at his request in foreign currency.

7. An incentive reward is paid to the author of an invention, who has transferred the right of exclusive use of the invention to an enterprise, in the amount of not less than the average monthly salary of a worker of this enterprise by the patentee within three months from the day of entry of the invention in the USSR State Register of Inventions.

Article 42. The Liability for the Unpunctual Payment of the Reward

For the unpunctual payment of the reward the enterprise, which is guilty of this, pays the author for each day of delay a fine in the amount of 0.04 percent of the amount due for payment.

Article 43. The Incentive for the Contribution to the Development and Use of an Invention

1. The enterprise-patentee for three years from the date of entry of the invention in the USSR State Register of Inventions and the enterprise-licensee for three years from the date of the conclusion of the licensing agreement annually pay the people (including those not working at this enterprise), who contributed to the development and introduction of the invention, a reward regardless of other types of payments.

This reward can also be paid to the author of the invention, if he took part in the drawing up of the technical documentation and the preparation of the invention for use.

2. The amount of the reward, which is paid to all people for the contribution to the development and use of the invention, is established in the amount of not less than 30 percent of the profit (the corresponding part of the revenue), which is annually derived by the enterprise from the use of the invention, and for an invention, the effective impact from which does not take the form of a profit or revenue, in the amount of three percent of the share of the cost of the product (operations and services), for which this invention accounts.

IV. The Labor and Other Rights and Privileges of Inventors

Article 44. Labor Rights

1. The author has the right to participate in the operations on the preparation of the invention for use in production (in the drawing up of the technical documentation, the production and testing of the prototype of the product, the organization of production) and to carry out author's supervision of the performance of these operations.

2. For participation in the preparation of the invention for use and the carrying out of author's supervision the author can be completely or partially relieved for a while

from the performance of his basic job with the remuneration of labor in the amount of not less than the average wage received by him, while in case of the performance of these operations outside the place of the permanent job a labor contract with the remuneration of labor subject to the difficulty of the work being performed is concluded with the author.

3. The amount of compensation of the additional expenses of the author of an invention, which are connected with participation in the operations on the preparation of the invention for use or with the carrying out of author's supervision outside the place of his permanent residence, is established in accordance with the contract with the interested enterprise.

4. The author of an invention, who works at an enterprise and has transferred the right to the use of the invention to the state, as well as the author of an invention, who created the invention in accordance with an official assignment, which was received from the enterprise, or in connection with the performance of an official assignment, have the right to the receipt of assistance from the enterprise in the drawing up of the application.

5. The position, the continuous length of service and the length of work in the specialty, the right to leave, and the other rights and privileges, which have been established for the place of the permanent job, are retained for the author of an invention, who has been relieved of his basic job.

6. In case of the reduction of the number or staff of workers of an enterprise inventions have preference to be kept on the job.

7. An entry on inventions, which have been used in the national economy of the country, is made in the labor book of the author with the indication of the amounts of the paid reward.

8. If as a result of the use of an invention at an enterprise new norms and rates are introduced, the labor of the author, as well as the labor of the workers, who participated in the preparation of this invention for use, are paid for at the former rates for 6 months from the day of the introduction of the invention.

Article 45. Housing Privileges

Additional living space is granted to the authors of used inventions, which are of great national economic importance, in conformity with prevailing legislation.

Article 46. Pension Privileges

The author of an invention, to whom a pension is paid, in the case of participation in the operations on the use of his invention, retains the right to the receipt of a pension in the full amount regardless of the received wage.

The reward, which is received by the author from the use of his invention, is included in the amount of the wage, on the basis of which the pension is calculated.

Article 47. The State Stimulation of the Inventor

1. The author of an invention by statement at any stage of the consideration of the application for the invention has the right to confer on the invention his own name or a special name.

2. The honorary title "Honored Inventor of the USSR" can be conferred by the Presidium of the USSR Council of Ministers on the author of an invention which commences a new direction in the development of engineering and technology.

The honorary title "Honored Inventor of the Republic" can be conferred by the Presidium of the Supreme Soviet of a union or autonomous republic on the author of an invention which is of great national economic importance.

3. The academic degree of candidate or doctor of sciences of the corresponding type without the submission of a dissertation can be awarded to the author of an invention, the use of which made it possible to solve an important scientific and technical problem in the national economy, by the Higher Certification Commission attached to USSR Council of Ministers on the representation of the USSR State Committee for Science and Technology.

Article 48. The Transfer of the Rights of the Author of an Invention (the Patentee) Through Inheritance

The right to the submission of an application and the patent for an invention, the exclusive right to the use of an invention, as well as the right to the reward and the revenues from the use of an invention are transferred through inheritance.

V. The Protection of the Rights of the Inventor and the Patentee

Article 49. Organs Which Consider Disputes Connected With Invention Activity

Disputes, which are connected with invention activity, are considered by people's courts, kray, oblast, and city courts, courts of autonomous okrugs, the Supreme Courts of union and autonomous republics, the USSR Supreme Court, and the USSR Patent Court.

The resolution of disputes, which are connected with invention activity, among enterprises is carried out by organs of state arbitration.

Disputes, which arise in connection with the exercise of the labor rights of the authors of inventions, are considered in conformity with the legislation on the procedure of the consideration of labor disputes.

Article 50. The Organization and Competence of the Courts Which Consider Disputes Connected With Invention Activity

1. People's courts, kray, oblast, and city courts, courts of autonomous okrugs, the Supreme Courts of union and autonomous republics, and the USSR Supreme Soviet are competent to consider in accordance with the procedure, which is established by civil procedural legislation, disputes connected with invention activity, with the exception of the categories of disputes, which have been assigned to the competence of the USSR Patent Court.

There are assigned to the competence of the indicated courts, in particular, disputes:

- on the authorship (coauthorship) of an invention
- on the establishment of the patentee
- on the infringement of the exclusive right to the use of an invention and other property rights of the patentee, which follow from the patent for an invention
- on the conclusion and fulfillment of a contract on the use of an invention, including on the use of an invention by an enterprise, when a worker of the enterprise is the patentee
- on monetary compensation for the use of an invention during the period of its temporary protection and on its amount
- on the recovery of the reward for the use of an invention
- on the distribution among the coauthors of the reward for the use of an invention
- on the right of prior use.

2. The USSR Patent Court considers the following categories of disputes:

- on the refusal to issue a patent for an invention by the Appellate Council
- on the recognition of an issued patent as invalid in part or in full
- on the granting of mandatory and compulsory licenses and on the amounts of the payments in accordance with such licenses
- on the amount of compensation in case of the compulsory redemption of a patent
- on the rejection of the transfer to foreign natural or legal persons of the right to the use of an invention in accordance with the patent.

The USSR Patent Court, moreover, considers cases regarding demands on the making of changes in the composition of the coauthors of an issued patent, as well as on the issuing of a patent for an invention in the case examined in Point 6 of Article 18 of this Law.

3. The USSR Patent Court consists of a collegium for patent cases and the Presidium of the USSR Patent Court. A decision, which has been made by the collegium for patent cases, can be reviewed for purposes of supervision on the protest of the Chairman of the USSR Patent Court or the USSR Procurator General by the Presidium of the USSR Patent Court.

4. The Chairman, the Deputy Chairmen, the members of the Presidium, and the members of the collegium of the USSR Patent Court are elected by the USSR Supreme Soviet for a term of 10 years.

5. The organization and procedure of the activity of the USSR Patent Court are governed by the law on the USSR Patent Court.

Article 51. The Liability for the Infringement of the Rights of Authors of Inventions

The appropriation of authorship, the compulsion of coauthorship, and the divulgence of the essence of a proposed invention before the publication of the application without the consent of the author entail criminal or other liability in conformity with prevailing legislation.

Article 52. The Liability of Officials for the Violation of Legislation in the Area of Invention

Officials bear criminal, administrative, or other liability in conformity with prevailing legislation, if they are guilty of the commission of the following actions:

- the inclusion among the coauthors of people, who did not take a direct creative part in the development of the invention
- red tape, the negligent or unconscientious treatment of their duties in case of the drawing up of applications for inventions, as well as in case of the use of an invention and the payment of rewards to the authors of the inventions and to the people, who contribute to the development and use of an invention
- the submission of unreliable state statistical returns on the use of inventions
- the infringement of other rights and legal interests of inventors.

VI. Concluding Provisions

Article 53. Legislation of the USSR and the Union Republics on Invention

The legislation on invention activity consists of this Law and other acts of legislation of the USSR and legislation of the union republics on questions which have been assigned to their jurisdiction.

Article 54. The Rights of Foreign Citizens, Persons Without Citizenship, and Foreign Legal Persons

Foreign citizens, persons without citizenship, and foreign legal persons enjoy the rights, which are stipulated

by this Law and other acts of legislation of the USSR and the union republics on invention activity, on equal terms with citizens and legal persons of the USSR, if nothing other follows from this Law and other acts of prevailing legislation.

Article 55. The Rights of Joint Ventures, International Associations and Organizations

1. The provisions of this Law apply with respect to joint ventures, international associations and organizations, which have been established on the territory of the USSR with the participation of Soviet enterprises and foreign enterprises, organizations, and firms.

2. The procedure of the issuing of mandatory licenses, which is stipulated in Point 1 of Paragraph 30 of this Law, does not apply with respect to joint ventures, international associations and organizations.

3. The patenting in foreign countries of inventions, which were developed at joint ventures, international associations and organizations, as well as the organization of invention activity at the indicated ventures, associations, and organizations are carried out in conformity with their constituent documents.

Article 56. International Treaties

If different regulations than those, which are contained in USSR legislation on invention, are established by an international treaty of the USSR, the regulations of the international treaty are used.

Decree of the Presidium of the USSR Supreme Soviet "On the Draft of the Law on Invention in the USSR"

The Presidium of the USSR Supreme Soviet resolves:

1. To publish the draft of the Law on Invention in the USSR, which was submitted by the USSR Council of Ministers and was modified by the Committee of the USSR Supreme Soviet for Science, Public Education, Culture, and Training jointly with other committees of the USSR Supreme Soviet and commissions of its chambers, in the newspapers IZVESTIYA SOVETOV NARODNYKH DEPUTATOV SSSR and TRUD.

2. To charge the Committee of the USSR Supreme Soviet for Science, Public Education, Culture, and Training with other committees of the Supreme Soviet and commissions of its chambers and with the participation of the USSR Council of Ministers to generalize by 1 July 1990 the remarks and suggestions on the indicated draft law.

[Signed] Chairman of the USSR Supreme Soviet A. Lukyanov

Moscow, the Kremlin. 3 April 1990.

Foreign Ministry's Scientific Council Notes Goals, Policies

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[Main report delivered by Eduard Shevardnadze, chairman of the Scientific Council, member of the CPSU CC Political Bureau, and minister of foreign affairs of the USSR, and speeches by E. P. Velikhov, Y. A. Ryzhov, V. M. Matrosov, V. K. Volkov, E. A. Pozdnyakov, V. V. Zhurkin, V. A. Martynov, B. N. Topornin, A. V. Yablokov, Y. A. Osipyan, K. V. Frolov, I. M. Makarov, Y. N. Sayamov, G. I. Marchuk, B. A. Grushin, A. A. Gromyko, E. A. Lukyanova, V. N. Chernega, R. N. Pullat, Y. M. Kagan, A. A. Kuzmin, V. P. Zinchenko, and M. M. Lebedeva at a meeting of the Scientific Council of the USSR Ministry of Foreign Affairs on 24 November 1989; first two paragraphs are INTERNATIONAL AFFAIRS introduction]

[Text] On November 24, 1989, a most interesting event—a meeting of the Soviet Foreign Ministry's Scientific Council—took place in a period mansion on Moscow's Alexei Tolstoy Street. It brought together in the white marble hall, the scene of many an action by diplomacy past and present, a representative group of Soviet scientists associated with highly important lines of foreign policy. The meeting was chaired by Eduard Shevardnadze, member of the CPSU CC Political Bureau and Minister of Foreign Affairs of the USSR.

The participants included leading Soviet authorities on science and technology. Following are the main points of the paper read by Eduard Shevardnadze and of the ensuing discussion.

Eduard Shevardnadze: I see the purpose of this meeting, the first in a series of contacts between diplomacy and science that are assuming a systematic character, in concentrating intellectual forces to the utmost at the peak of perestroika tensions at home and abroad to save the renewal processes begun in our country and to direct them toward rational, intelligent and relatively painless changes.

It is not a question of establishing a sort of scientific first-aid service at the disposal of foreign policy or a system of rapid intellectual response to problems encountered by diplomats. The task is to evolve a mode of cooperation between foreign policy and science or rather to ensure their confluence and interpenetration in our common interests.

What are these interests? Naturally, they are predetermined by the aims and tasks of perestroika, by the problem of its survival, progress and final triumph—a matter of overriding importance to us. I need hardly demonstrate that destroying or winding down perestroika would not augur well for science. Political stability in society is the best background for the normal development of fundamental and applied research in the context of the growing worldwide circulation, exchange

and reciprocal enrichment of ideas. Throughout the past five years, foreign policy and diplomacy have been using all their assets and means to contribute to these processes. But they, for their part, need to operate in stable and predictable conditions. It has been noticed that any tension inside the country impinges most negatively on our external possibilities. This is one reason why diplomacy has a vital stake in an influx of fresh, uncommon ideas, in a solid foundation for its effort in a situation refusing to fit in with standards and notions unified for decades.

The interests of science and diplomacy are so closely intertwined today that I hardly like to uphold the necessity for alliance and cooperation between them. Nevertheless, let me give a few examples.

Peaceful use of space is a vast area in which numerous branches of knowledge can do research. But space is also a sphere arousing the interest and engaging the effort of foreign policy. Diplomacy is obliged to open the way to this common property of humanity for science, and it is doing so. The agreement on joint space research signed with the United States is an indication of this. And the latest example is the Soviet-Canadian agreement on joint research in the Arctic just signed.

We thought and talked a lot about thermonuclear fusion that rockbed of the energy industry to come, but had it now been for the Geneva meeting, we could hardly have arrived at a conceptual design and set about putting it into effect.

Alliance between science and diplomacy is a decisive condition for the democratisation of policy, an indispensable component of equipment for the breakthroughs in the sphere of foreign policy.

Indeed, foreign policy today comes into contact with a very wide range of ideas, phenomena, novelties. It must at the very least be able to distinguish between the present and the past, between what is progressive and what holds no promise of advance.

To this end diplomacy must not only know the contemporary state of the world but see the development trend of human thought, society, technology.

To put it plainly, diplomacy is under duty to be well familiar with them. The point is that without attaining a higher level of scientific knowledge, it will be unable to do its job competently. Nor can it dismiss the problem—as it used to do in the past—by resorting to the traditional formula, "Let science sort it out." Nowadays diplomacy, too, must see clear in problems like, say, alternative energy resources because these resources are now the object of negotiations and have begun to attract increased attention on the part of big politics.

Crisis situations in the planet's economy and environment, overpopulation, gene engineering and many other things are a standing item on the agenda of foreign policy.

This makes education the first level of links between diplomacy and science. Of course, what I mean is neither elementary schooling nor expert services but the formation of scientifically valid concepts of the nature and pace of changes in the life of man and humanity, primarily in the material sphere.

For a multitude of objective reasons which I will not go into here, we were compelled in the past to maintain rigorous rules of secrecy in our country. In what was a closed society, science became one of the closed zones. But this also resulted in cutting off channels for the flow of knowledge and ideas and in intellectually impoverishing the social atmosphere.

It is now very difficult in our country to obtain exhaustive information showing how far scientific and technological progress has gone and especially where the place of Soviet science is.

The media in Western countries regularly report technological breakthroughs. They have sections and programmes dealing with achievements in science and technology.

An American newspaper, for instance, may supply information on the manufacture of microprocessors almost as lavishly as reports on baseball or football. The turns in the struggle for markets of four-megabit chips are covered as important economic and political processes.

Staff members of our embassies know that such a chip can store 200 pages of text. They know of the high speed of up-to-date computers.

They cannot integrate that knowledge into their political and economic analyses, for they have no comparative "domestic" data and realise that information of that nature would simply fail to evoke the right response at home.

This is not a diplomatic problem but a problem facing our society. Our mentality shows a considerable lag. Nor is this only because we are "lazy and uninquisitive" but because we stick to obsolete scientific and technological categories.

Diplomacy has a poor knowledge of the contemporary language of science, to say nothing of the fact that it lacks an adequate idea of present-day technological realities. What do we know about, say, the cost of one watt derived from a solar cell, about the situation in the area of alternative sources of energy or the technology of desalting sea water?

Yet all this is important for the future development of countries and the world economy.

Informatics, genetics, today's science of materials are still exotic spheres for us in which we occasionally cannot tell fact from fancy.

I may be exaggerating but basically this picture is close enough to the actual state of affairs and therefore gives

cause for concern. Obviously, we cannot carry on an up-to-date policy without an up-to-date idea of the basis on which society exists.

I think science as well has an interest in raising the science-intensiveness of foreign policy.

Hence our first proposal is for science to help us shape the scientific orientation of members of our foreign policy service.

We realise how very busy scientists are. Still, we ask you to find a way to communicate with diplomats, to think over likely forms and suggest system approaches to this task. There could be joint meetings of the Academy of Sciences Presidium, the scientific councils of various institutes and the Ministry Collegium, joint discussions on key problems and current issues, "situational rooms", just "tea parties" without a prearranged agenda, participation by our officials in scientific brainstorming.

There is another level of cooperation with science, a traditional one: working out a position and deciding on our attitude to practical items on the international agenda.

The USSR Academy of Sciences, academic institutes and a whole range of departmental research centres are full-fledged participants in the drafting of foreign policy decisions. They play a direct role in many sectors of international cooperation. I will return to this later on. At the moment I am speaking of the need to extend our informal contacts.

Let us take, for instance, the problem of incorporating our state in the world economic system. It has numerous aspects. Foreign policy requires the fullest possible knowledge of all factors having to do with the solution of this problem of strategic importance to our country.

We need permanent informal exchanges with science on all these indicators as well as theoretical and practical projects based on our real possibilities and interests.

We are already joining in a concrete discussion of the terms of our membership in international financial and economic organisations and institutions. Regrettably, we still lack a well-considered action programme, nor are we clear enough about the extent to which we are prepared for integration into the world economy in this or that form.

We must proceed without delay to evolve a concept of our participation in the international division of labour. Why not organise a series of meetings between scientists, economic executives and diplomats to this end?

We are willing to engage in a substantive discussion on possible forms of cooperation.

Numerous problems call for a combination of knowledge and intellect. Meanwhile there is no permanent dialogue between us and science on the whole spectrum of foreign policy issues.

Our lag is a further trouble. We generally work on things that belong to the past or at best on what must be done to meet present-day needs. We do not blueprint likely solutions for future challenges that may come up, nor do we carry our quests beyond our positions of today.

This is even dangerous in a sense. Work on current tasks only, without any advance calculations, may lead to serious blunders and mistakes.

The mission of science is to help foreign policy see things in the right perspective, to supply it with forecasts, to warn us of problems that we may encounter on our way.

It is positively our duty to find a way out of our habitual time-trouble and put joint prognostication on a solid basis.

A third level of our interest in science is connected with the need to develop the theoretical basis of foreign policy.

This could be discussed at great length. I wish to illustrate by citing some specific examples.

We have formulated and put forward several propositions of principle. They are as follows:

- The unity and interdependence of the world.
- The priority of universal values.
- Freedom of choice.
- A balance of interests.

They require theoretical backup, scientific substantiation, an in-depth elaboration from the standpoint of political history.

New political thinking has as its aim attainment of a nuclear-free, non-violent, demilitarised world.

Science could greatly help foreign policy by proposing what I would describe as a working model of organising such a world, ways and means of maintaining universal security.

We must carry forward the concept of democratising and humanising international relations. It is still deficient in concrete substance.

We would certainly welcome it if science were to offer foreign policy other major conceptual ideas.

The recent period in the world and in our country has seen a rapid accumulation of questions each of which is tantamount to the classical "To be or not to be?" This question applies to existing socio-political, state and system structures, to an order propitious for perestroika. It applies to the world in its eternal dimensions. The questions are so serious that history may be said to have put no comparable questions to humanity since the October Revolution or World War II.

Can we answer them? Can we say explicitly what is going on? Unfortunately not. We must admit, however, that

building up at the poles of scientific thought existing in the world is an intellectual potential that is trying to explain developments.

I will not name widely known Western politologists concerned with the problem. Nor will I list the institutions and corporations expending much energy and money on it. What I consider far more indicative is the work done by Francis Fukuyama, a young American politologist whom I met in Wyoming this fall. He was a member of the working group during our talks with Baker, and meanwhile passions ran high over his article "The End of History?"

Published in a quarterly with a relatively small circulation, the article made quite a stir and touched off a heated debate among numerous Western scientists and politicians. Notwithstanding the question mark in the title, which must be a concession to the need for scientific objectivity rather than an expression of doubt on the author's part, Fukuyama draws a perfectly definite conclusion about the "triumph of the West, of the Western idea", which "is evident first of all in the total exhaustion of viable systematic alternatives to Western liberalism". "What we may be witnessing," Fukuyama writes in a further passage, "is not just the end of the Cold War, or the passing of a particular period of postwar history but...the end point of mankind's ideological evolution and the universalisation of Western liberal democracy as the final form of human government."

I do not see my object in arguing with the author, in demonstrating the indefensibility of that premise of his. I see it as merely an attempt to grasp and explain what is going on as well as to accomplish the equally important task of supplying Western political thought with new theoretical arguments in support of its practical actions.

The article was ignored by our scientists and commentators. There was no reaction from us. Do we really have nothing to say?

After all, the article touches upon the major issue of the historical destiny of socialism and its values.

I wish to add as a general statement that I and my colleagues experience a certain insufficiency or shortage of counterarguments free of the stamp of the "battle of ideas" as an end in itself and offering a serious scientific analysis of world trends and processes, drawing practical conclusions from it and making practical foreign policy recommendations.

This is precisely what we need, that is, something more than a mere record of current events, no matter how full or methodologically sound. We also need forecasts of what is likely to happen.

There is plenty of evidence that can be used for such an analysis, and what is more, it is extremely complex and dramatic and it is mounting at a stunning rate. Its tide has been particularly high in recent weeks. The advent of

Solidarity to power in Poland, the formation of multi-party structures in Hungary and deep-going changes and renewal processes in Bulgaria were followed by fast-developing events in the German Democratic Republic and a new situation over the "German-German question."

As practical workers, we must stop to think what all that means to us here and to the socialist community, to the socialist world as a whole. How is it going to influence the situation in our country? How will West Germany's NATO allies behave? What promise do current events hold out for European integration plans?

The only thing we can affirm with complete certainty at the moment is that nobody wants anarchy or chaos, at least judging by what we hear. But there is a difference between statements, even perfectly sincere ones prompted by the best of intentions, and the release of irrational forces which occurs in history irrespective of the will of politicians every time large masses and numbers come into play.

I cannot help saying again that big politics are short of a scientific component. When, in the wake of the conclusion of the 1970 Moscow Treaty, the Federal Constitutional Court of the FRG, recognising the validity of the treaty, made a reservation by stating its vision of a future Germany within the 1937 boundaries of the Reich, our diplomats and scientists did not find that worthy of special attention. There was criticism, sure enough, but no scientifically sound proof of the illegitimacy of the claim made by creeping revanchism.

In today's context, however, that reservation emerges as an ideological rationale for revanchist aspirations.

This fact shows only too clearly that there are no trifles which either big politics or big science can afford to disregard.

It also illustrates the main thesis of this discussion: what we want is not scientific attendance for our official function nor pills for political headache but more science-intensive diplomatic "production" and a bigger policy-forming role for science.

The task of laying a solid scientific groundwork for Soviet foreign policy has been set by perestroika itself. How are we fulfilling it? What shortcomings are there? What themes would we like our leading scientific forces to concentrate on?

Before giving generalising answers to these questions, I wish to repeat some fundamental suggestions.

First, scientists can and should become full-fledged co-authors of the foreign policy strategy of the state, of all its components from disarmament and security to ecology, human rights and culture.

As co-author and co-developer of foreign policy concepts and ideas, science can and should criticise and evaluate the effort of Soviet diplomacy. Besides, we need a

scientific examination of our initiatives and proposed actions. However, it is not a question of criticisms alone, for we also need recommendations.

Second, close ties with science should help us improve professional skill and mould a new type of diplomat open to innovation and closed to dogmatism.

Third, cooperation with diplomacy can be of substantial benefit to science, especially by helping appreciate the contemporary requirements of international development and the tasks of our state in various foreign policy areas.

Now for a brief review of what the Ministry has accomplished. At a Collegium meeting last summer, we summed up the main results of the work done, and afterwards we submitted a survey of the Ministry's activity to the USSR Supreme Soviet.

The Ministry may be said to have formed an organisational structure for interaction with scientific institutions. It now has a Scientific Coordination Centre. Functioning in the majority of departments and directorates are scientific consultative councils which include researchers.

The Ministry has held a scientific-practical conference. Diplomats and scientists have met over sixty times in the past two years. Experts from scientific institutions participate frequently in working meetings at the Ministry that discuss our position at international talks.

Another form of cooperation is research into problems of interest to us. The relevant investigations—about 200 in all—are either supplied to us directly by institutes or carried out under special contracts, as has been customary of late.

Participation by scientists in talks of key importance as members of Soviet delegations has become an effective form of cooperation very useful to the Ministry. Scientific experts were included in nearly all our delegations to meetings held within the framework of the Conference on Security and Cooperation in Europe, in particular the Vienna talks on conventional armed forces.

Joint participation by scientists and Foreign Ministry officials in international symposiums and conferences on current foreign political subjects is a relatively new sphere of cooperation between scientists and diplomats.

A whole number of promising ideas worked out and advanced by our scientists have been included in Soviet foreign policy initiatives. They were applied in practice in deciding on the position of the Soviet delegation to the Vienna Meeting of the participating states of the CSCE on such issues as the formation of a common European legal and economic area, the promotion of contacts between the Soviet Union and the Council of Europe, and so on. During our recent talks with the US Secretary of State, we used the results of research into American legal practice done by a Soviet institute under a contract with our Ministry. Scientific institutions of Union

republics have begun contributing their share to cooperation between science and diplomacy. In preparing material for exchanges with representatives of the Vatican, we are drawing on research carried out by the Lithuanian SSR Academy of Sciences Institute of Philosophy and Law.

In 1988, the Ministry established a Directorate on International Scientific and Technological Cooperation. We have been cooperating with the USSR Academy of Sciences in setting up in Moscow a branch of the World Laboratory, whose declared aim is to conduct scientific research open to all countries and to use scientific achievements for peaceful purposes. The Foreign Ministry took part in organising the Baikal International Ecological Centre. A sphere of joint effort today is solution of so complex a problem as harnessing Soviet scientific organisations to projects encompassed by Eureka, the West European technological cooperation programme.

The Foreign Ministry is prepared to assist science in organising international cooperation in relatively novel fields like the acquisition and use of high-temperature superconductive materials, super-television equipment, information technology.

Our growing ties with science have not gone unnoticed in the West. A report prepared by John Hopkins University, USA, noted that thanks to a changed political atmosphere in the Soviet Union, Soviet scientists and diplomats showed greater readiness than ever for frank discussions on problems of contemporary international relations. As distinct from earlier decades, the political authorities invited specialists from the Academy of Sciences to join in debates on problems relating to official Soviet policy and asked them to propose new political alternatives.

Far be it from me to want this review to be seen as a festive account compiled according to standards of the recent past. Critical self-appraisal leaves no room for complacency. The main unpalatable conclusion we draw from it is that while there are noticeable advances in some areas, we have yet to establish permanent and effective contacts with science. This is chiefly our fault. Our echelons offer scientists no guidance on the relevance of this or that line of research. As a consequence, diplomats and researchers carry on their work along parallel lines, or lines that never meet.

There exists a sort of professional snobbery making diplomats insufficiently receptive to advice or criticism from science.

We see one of the big shortcomings in the fact that scientists are barred from participating in the drafting of conceptual foreign policy documents.

For all that our embassies show an increasing interest in cooperation with the scientific community at home and abroad, their overall performance in this respect is plainly inadequate.

Some embassies merely register the arrival of our scientists instead of enlisting their assistance in establishing closer ties with foreign scientists.

I believe we ought to concern ourselves more concretely with what I would call diplomaticising science by assigning scientists to some of our leading embassies. We should do this by examination, bringing in the most gifted competitors for "diplomatic degrees", so to say, young scientists included.

Generally speaking, we owe youth a big debt. We look to academic and departmental centres but not to universities, not to research done by them. Contact with young scientists is a vital necessity to us, and we will do our best to establish it.

We have vast opportunities for this. International scientific ties are an example. As a rule, they involve a select group—we constantly hear the same names and see the same faces. We could help extend this group by drawing new people, young scientists, into contacts.

Some of our foreign partners, especially in developing countries making rapid progress, attach priority importance to agreements with us on scientific cooperation, which they give precedence even over trade agreements. Hence the exceptional importance of bilateral scientific ties. Our colleagues at the Academy of Sciences are probably well aware of this. In the case of the Ministry, however, ties of this nature are sporadic. One would think that this line is taken care of by the Scientific Coordination Centre, the Directorate on International Scientific and Technological Cooperation and territorial departments, yet bilateral ties in the area of science and technology lack proper substance.

Lastly, the Ministry and Academy should draw more vigorously on the scientific potentialities of Union republics. Talk about this has been going on for a long time but no decisive change has come about yet.

Self-criticism opens the door to criticism. I hope you do not misunderstand the general criticisms offered by us on the basis of past experience.

To be frank, our dissatisfaction with the state of affairs is not limited to the Foreign Ministry. I am not going to speak here of the manifest incompetence of certain of our scientific partners, of the deplorable fact that they are unskilled in analysis and prognostication. Nor am I going to focus attention at this point on propositions formulated in a sensational vein, on the aspiration to shake pillars or the ostentation of would-be independent thinking.

All that is more or less clear. What is much more serious is a plainly insufficient ability to perceive international processes with all their numerous facets and contradictions, the inadequacy of conceptual approaches coupled with clearly absolutist attempts to represent speculative constructions very far removed from reality as the ultimate truth. We are still deficient in multiplicity, in

multidimensional forecasting of nascent events and trends, in assessments based on a broad and comprehensive analysis of any given situation.

A further major shortcoming which prevents science from joining actively in the policy-forming process is the obvious shortage of experts well versed in problems that we are interested in. What I meant, is among other things, regional geography, the study of big and small countries undergoing changes that are entirely at variance with our traditional notions of them, of their place, role and leverage in international affairs. We are also suffering from a bad shortage of specialists delving into the theory of international relations and studying the regularities and peculiar aspects of the processes unfolding in this sphere today. Politics and diplomacy are short of profound treatises on the ethnography, religion and ethnic psychology of other countries and peoples. There are very few scientists even in the military political sphere, a seemingly leading one, and they certainly cannot meet all the vastly varied requirements of practice without detriment to quality.

Perhaps the blame for this should be put on ourselves because we have a poor knowledge, if any, of our potential partners, do not encourage the training of young specialists nor assign scientific research to gifted young diplomats. Our own departmental higher school must apparently take much of the blame for this shortage. Be that as it may, our demand today exceeds offer, and we would like to know your opinion of how to close this gap.

I have already spoken about international scientific contacts and interchanges. They have gained in substance, and joint research is expanding visibly as a permanent practice. The foreign policy departments of many countries show a direct interest in joint projects of this kind.

Regrettably, little use is made of the opportunities offering in this sphere. What is put first fairly often is reasons of corporative rivalry rather than mutually beneficial cooperation.

Whereas scientists are drawn more and more into the practical work (that of delegations, intergovernmental conferences and into other actions) the reverse process—participation by diplomats and representatives of ministries and state committees in scientific actions—is making much slower headway. The role of diplomats is particularly small in new sectors. The year 1989 has seen a series of international conferences on conversion (in the United States, West Germany, Italy and other countries) at which the West was represented by scientists and practical workers, including Bundestag members in the case of the FRG, whereas the Soviet Union sent only scientists and spokesmen for non-governmental organisations. Not only was the Foreign Ministry poorly informed of the work of those conferences, we even cannot obtain the necessary final documents.

Attempts by our Scientific Coordination Centre and some other divisions of the Foreign Ministry to take part somehow in joint scientific projects or at least routine international meetings of scientists on problems of interest to us are occasionally seen with jealousy and met with suspicion by the sponsors.

We see the reasons for this in something more than the demerits of the command system, recurrences or the fact that formerly most of the proposals and conclusions of scientists were ignored, as in the case of Afghanistan or problems of military cooperation with some developing countries.

There are also many purely subjective reasons. It is so much easier and less troublesome to provide "services" than to engage in anything larger than skirmishes.

We can hardly confine ourselves to calls for greater firmness of principle, greater independence of opinion, a more critical approach to things, greater collectivism. The trouble is that science has no independent status. And the task facing it is to shake off departmental fetters and adopt a position of its own, realising the advantages of cooperation with us. Nothing would be wrong with Academy of Sciences institutes or the research centres of government departments and universities differing in their outlook on foreign policy issues or with competition between schools of thought and clashes of opinion or approach becoming a routine matter. Controversy, debate and healthy competition are normal manifestations of a process whose main purpose is to establish the truth. Yet institutes persist in cooperating in the old way, exchanging theses and monographs to be reviewed and safeguarding each other against what they regard as unnecessary headaches.

I'd hope a further decentralisation of foreign political research will lead to a real multiplicity of approach to the solution of problems one prompted by scientific and civil conviction and not imposed from above or generated by departmental interests.

Secrecy still stands in the way of more active participation by our scientists in work on foreign policy problems. The situation is downright intolerable in some cases. For instance, we discovered as we studied academic investigations into the problem of international arms deliveries that impressive scientific instruments fail for lack of relevant information. Researchers are denied data on the whole range of Soviet deliveries—data which are an elementary requisite for scientific analysis. Now how can anyone analyse international trade in arms without knowing the role and place of the Soviet Union in this activity?

The question is rhetorical but it calls for practical conclusions. There exist definite international standards which we must move closer to. There is the international practice of releasing appropriate information, and if we

really want to know something about others, it is naturally our duty to tell something about ourselves. Nor should we conceal the actual state of affairs from ourselves.

Using the scientific potential of government departments is still hampered by an overly protective posture, and they often waste their energies, not on making an objective appraisal of events or working out proposals, but on defending or justifying decisions made in the past and narrow departmental interests. It would therefore be a good idea to think about ensuring that independent and objective evaluations are worked out and about setting up an extradepartmental scientific evaluation centre.

We are very keen on our scientists extending their ties with foreign colleagues. We would like them not only to attend international conferences but to deliver lectures at foreign universities on a regular basis and to engage in joint research there. By the same token, we should provide greater opportunities for foreign scientists to work in our scientific institutions and universities.

We must put our heads together to conceive and evolve a system of coordinating efforts in this field.

The problems of forms of cooperation are still unsolved. The chief problem as of now is the material basis of cooperation. With scientific institutions adopting a self-supporting and self-financing system, earlier mechanisms based on "telephone law" as well as on philanthropy stop functioning. Many institutes have already notified us that they are not going to supply us with gratuitous analyses any longer.

Well, we agree that ideas are the most expensive commodity and that one must not save on them.

Relations between diplomacy and science need to be placed on a sound economic basis. It is time to realise that foreign policy "production" is one of the most profitable spheres for such investments that the country has. Logically, appropriations for the drafting of disarmament projects and for work on other foreign policy problems of vital importance whose solution promises our economy enormous saving are as important as investments in other fields. We do not at all seek to monopolise state orders for research, let alone to invade the sphere of fundamental research. I have already said that our approach does not come down to emphasising the provision of applied services to diplomacy. Even so, we are entitled to participate in the formulation of state orders and make suggestions, and occasionally to offer advice.

With this aim in view, we would like to discuss with you the possibility of signing agreements on cooperation between the Foreign Ministry, on the one hand, and the Academy of Sciences, the State Committee on Education and departmental centres, on the other, which could provide for the main forms and channels of cooperation meeting each other halfway.

For our part, we are willing to respond favourably to any reasonable suggestions concerning incentives at the Ministry's disposal and of interest to scientists.

We would like to cooperate with science on the widest possible range of problems. To be sure, there are key problems to which we devote special attention. There is, for instance, the concept of new political thinking, which has largely become part of political practice and gained appreciable experience requiring theoretical assessment. There are also the problems of the relationship between universal and national interests, of deideologising state-to-state relations, politics and morality, of new dimensions of international security, as well as problems relating to other politico-philosophical categories.

I have mentioned the far-reaching changes effected in socialist community countries, the remaking of traditional state and geopolitical structure. We have a very big stake in an analysis of these developments and in forecasts of their likely effects.

We need scientific foundations on which the whole set of relations with socialist and friendly countries and countries close to us can be put on new principles. This applies to Eastern Europe and to what we call socialist-oriented countries.

Now is the time to grasp the new parameters of international security, that is, the military, political and economic effects of possible agreements on cutting Soviet and US strategic offensive weapons and substantially reducing troops and conventional armaments in Europe.

The problem of nuclear testing is as acute as ever. I would go as far as to say that it is gaining in acuteness. It is no longer in Nevada alone but in our own country, at Semipalatinsk, that the public mounts pickets and carries banners demanding an end to nuclear explosions. The voices of our nuclear physicists are clearly missing from that chorus. Testifying before the Supreme Soviet Committee on International Affairs not so long ago, I voiced the idea of forming an Association of Nuclear Scientists that could express an agreed opinion on the issue and tell our people and the world what it thinks of the problem of nuclear tests.

We are very keen on intensified research into international law. Reality puts to us at every turn difficult questions which cannot be answered as yet. I do not want to hurt anybody's feelings but let me say that this is one of the most neglected lines of research as far as we know. For all that there are numerous scientific institutions active in this area, the results they achieve are modest. We often have no idea of what is going on and where. The Foreign Ministry is now forming its Coordinating Centre, which is intended to pool isolated efforts and direct them toward applying in practice the concept of the supremacy of international law and establishing a universal legal order.

We are not indifferent to science's vision of the future of the scientific and technological revolution, of the possibilities for building a system of ecological security or of the evolution of demographic processes—in other words, of trends likely to have a serious impact on the formation of world politics in the 21st century.

Historians have set about "closing gaps" in our relations with a number of countries. This effort, which is complicated throughout, must be carried deeper. There are problems over access to archives but we plan to solve them, to remove obstacles to research.

On a broad basis, we call the attention of scientists to the question of the cultural component of foreign policy and what is known as cultural diplomacy. We need cooperation with archaeological, ethnographic, geographic, demographic, cultural and art institutes and the USSR Academy of Arts.

I would add to the problems of international law and human rights that I have listed so little known a sphere as the law of peoples.

Please help us work out scientific principles for conversion. This is a direct duty of scientists in the military-industrial complex.

I wish to re-emphasise our great interest in public opinion studies and in sociological research into Soviet foreign policy problems. Although our possibilities are limited, we have taken some steps in this direction on our own and are doing research with the assistance of academic institutes. But this is not enough. We do not think it is enough merely to study public opinion, for we must also think about how to shape and use it. Overall, it is virgin soil which we cannot cultivate by ourselves.

The Ministry is ready to take a direct part in the drawing up by the USSR Academy of Sciences and other scientific centres of plans for research into international problems with due regard to our requirements some of which I have listed.

Lastly, I wish to make a suggestion which may not be quite proper but which you will excuse because it is prompted by bitter experience. Scientists today are as politicised as anyone else, nor is this meeting likely to raise their already high political level. One has only to watch a televised debate in the Supreme Soviet to realise that many noted scientists have changed their jobs by becoming full-time MPs. This would have been fine if science proper could make normal progress without them.

Everybody is taken up with today's problems and wrestling feverishly with routine cares. Everybody is casting about for something, having no time to give thought to anything else. But what about guidelines for the future? Aren't we overlooking them as we work hard to win our daily political bread? There is no question but that we cannot survive without well-baked bread of this kind.

But neither can we survive unless society and the state get proper scientific nourishment.

Every one of our conversations with partners is accompanied by questions they ask about the fortunes of perestroika. We would be very happy if the right answers were formulated not only in parliaments or at rallies but in institutes and laboratories, in factories and mines, in fields and farms. More than ever before, we all need to work calmly for our future.

This is a general suggestion. As for specific requests, we direct them to the whole of Soviet science, including university and departmental scientific centres, which command large forces and are doing research in such spheres of interest to us as climate and environment, power engineering, space, the World Ocean, demography, biotechnology, the human gene.

We are looking forward to counter-proposals from you, not only on possible areas of cooperation, but on more rational and effective forms of it, such as could lend ties between science and diplomacy a rich and vital content.

Yevgeny Velikhov, Vice-President, USSR Academy of Sciences, Academic Secretary, Academy's Section of Information Technology, Computer Engineering and Automation, People's Deputy of the USSR: First of all, we all know well how greatly cooperation between science and diplomacy has grown and how real it now is. Not only the Minister but the entire Ministry take a most positive stand on science, realising its problems and supporting it.

Speaking of an end to tests, I must note that what happened yesterday was quite unexpected but, on the other hand, typical enough of the Supreme Soviet. I mean the fact that the debate on environmental protection led to the political question of ending tests. The question was almost put to vote there and since there is no possibility of vetoing it after voting the Supreme Soviet, we almost voted for an end to testing. The blame for that must apparently be put on the Committee on International Affairs and our own Committee on Defence and State Security, which didn't discuss the matter. But the Foreign Ministry overlooked something for its part. You will recall that when Reagan was about to leave for Reykjavik to meet with Mikhail Gorbachev, he had a discussion with Congress, and Congress struck out five or six points approved by it earlier. It did so to allow the President freedom of manoeuvre at the talks. As for us, we almost imposed a limitation on ourselves in regard to tests right before the Gorbachev-Bush meeting. I felt that we had failed to make a very important provision.

We still use old methods, after all. I voted and even lobbied for the Supreme Soviet to direct an appeal to the US Congress in favour of ending tests. But the Americans didn't even answer us. Such appeals are a purely token measure that produce no results. We must now

work out a concept. What are we doing? We are making arrangements with the Americans through Congress and through joint commissions.

As regards scientists, I believe every one of them has his point of view. It seems to me that we could discuss also a unilateral moratorium now that there is a huge stockpile of nuclear weapons and all those questions, but we should discuss them together with US commissions. And so I feel that we should step up our effort in this matter and work out a common point of view. We were greatly surprised when the Soviet Union unexpectedly agreed to continued talks on a 150 kiloton regime of testing, which is bound to delay things indefinitely, to create a deadlock. We should seek agreement through Congress, through our relations with Congress, and so on, through the channels of people's diplomacy, but don't let us mistake them for parliamentary or diplomatic channels.

Do we have a chance? I think we should work out a new concept with due regard to the situation in the country and the new international situation and proceed accordingly all along the line. Perhaps the administration will really shift position although I've so far registered no change of attitude to nuclear tests on the part of the Congressmen I met. Perhaps we should think not only about nuclear testing but about preparing in this connection for a further conference on non-proliferation, about the approach we should take to the issue of a nuclear-free world. It might be advisable for us to link nuclear tests to the entirely new situation not only over nuclear weapons but over nuclear power. Yesterday I met with a member of the Federal German Nuclear Society, who said that their paramount concern was the safety of our reactors and that they were therefore ready to help us. That is also what the US Energy Secretary tells us. And so we ought perhaps to revise our attitude even to the Baruch Plan, that is, to the idea of internationalising the whole nuclear cycle from mining uranium to burying waste. If we don't think this over now we will find ourselves in a very trying situation.

Our situation may become worse than America's from the point of view of burying waste materials. The last hope left to us is Novaya Zemlya. We are now holding talks on the Arctic. Apart from it, we will have no more uninhabited region left where any burying could be done. It seems to me that now is the time for us to consider the whole situation, bring about international talks and face up to difficulties. We might thus be able to get a new chance to make headway towards ending nuclear tests.

I fear that if the efforts made are isolated, with people's diplomacy doing one thing, Congress another and big diplomacy a third, we may either get nowhere or even achieve negative results. I believe we should go on eliminating all technical problems, as we did at Semipalatinsk and in Nevada, thereby proving the feasibility of seismic monitoring. That was a good result and we must carry it through to the end by demonstrating data transmission within a real timeframe. We are close to this and should press forward with our effort.

In this situation, I'm very grateful to the Foreign Ministry for its support on the issue of funding and verification. I'm sorry to say we have neither an agency responsible for this nor real funds, because the Defence Ministry understandably has no such funds, and the state commission for military-industrial technology has refused to allocate funds, with the result that technically verification is based on semi-voluntary effort. Occasionally we use chance means or draw on existing funds, as we did during the Black Sea and Semipalatinsk experiments. We need an entirely different situation, of course. Perhaps we should have an agency based on centres for the prevention of nuclear danger but we must have such an agency funded on a permanent basis because verification is a very serious matter.

In the light of the foregoing, I wish to state that right now there exists a certain contradiction between scientists in charge of verification and the Foreign and Defence Ministries. The point is that there is something of a tendency now to include all verification problems in talks. I regard this as a dangerous trend. What can be done within the framework of verification talks, of formal agreements between governments, is welcome but there must also be an independent channel in the form of independent scientists engaged in verification. The reason is simple: experience has shown that verification is delayed for a very long time if approached on the basis of reciprocity and negotiation. When verification facilities are being set up, it isn't important at all that this be done on a reciprocal basis. We used a Soviet ship to check the possibility of detecting a warhead. Now imagine asking the Americans to do as much in their own ship simultaneously and symmetrically. Talks on that would have taken a decade whereas without them we carried out our experiment. This is why it seems to me that we should proceed with great circumspection and use both channels. So much for disarmament problems.

To be sure, there are lots of other problems we must deal with in deciding on how to proceed after a 50 per cent reduction. We will have to discuss them thoroughly. We must think about an alternative in view of an obvious slackening of interest in strategic defence while work on it is continuing just the same. There are quite a few interesting proposals that ought to be discussed. I think one of the biggest tasks is to back this effort materially. This is very important.

The economy is another problem facing us. The Foreign Ministry should adopt a more active posture on consolidating the forces involved in our foreign economic policy. We have no real policy to guide us on how to enter the world market, how to build up our export potential and what this potential is in our case. Let me give you some examples. Here is a very typical if minor one. We've begun winning the West German market for our electric ovens. But as they are on the list of consumer goods, we have decided to withdraw from that market. This commodity will only be sold at home. I don't think this decision is correct because to win a market is to

achieve a lot. As for the money involved, we could earn it by selling products of an entirely different type.

Now that we have freedom, state property is as yet in the hands of different people, and ties with the outside world are assuming a most disorderly character. We need coordination on the Japanese model, which is unobtrusive and intelligent.

Now for another example. Small firms and small business can't cooperate with us because it would be awfully expensive for them. But there is a form. It has now been created in Montreal, where a Trade Centre has been established for just that purpose. It isn't like the Hammer centre in our country which provides hotel services but one where you can get quickly into touch with partners by means of up-to-date informatics. This is of tremendous importance to us both educationally and in terms of establishing ties because those of our industrial executives who can now enter into contact with Western partners, especially in connection with conversion, have no place where they can do so, where they can learn, where they can pick up contacts.

What do we have today? The Italian Ambassador says he's got 300 million that can be spent on setting up an Italy-USSR centre of that nature. Afterwards we would set up a Canada-USSR and then a USA-USSR centre. Moscow can't house so many centres. We need a single centre that would see to the maintenance of ties using up-to-date facilities. This would be no problem. We've opened various channels now and can discuss this, can switch to telefax lines and electronic mail and compress-video for teleconferences, to the right kind of communications. This centre should be enabled to settle all visa problems because in spite of all the tremendous improvements we now have, I, for one, waste a lot of time getting visas and booking tickets, which is terribly difficult now. That would really enable us to establish business contacts, for otherwise huge expenditures would produce few results. The centre should have subsidiaries to receive all our plant managers both through the ministries concerned and directly. All our managers should know there exists such a centre and be able to establish ties. We do need such a single centre.

Of course, there is also the issue of policy, above all export policy. We should ascertain the sectors where we've got a potential. It is clear that we've got a potential in the aircraft industry for we have a market for our aircraft. There are some other sectors. We must expand them and invest in them. I'm sure we still invest less than enough in them. Nor do we count on the economic factor. I'm speaking of aircraft as an example—we have dozens of other sectors where we possess an export potential but are not developing it, are not working to win markets, the world market. Buying something is easy but winning a market is a very hard task.

The West has achieved a high standard of consumption and prosperity not only by investing capital but by

spending a substantial amount of environmental "capital", by destroying much of its environment. As for us, we've destroyed it without achieving anything. And now we want to attain a comparable level of consumption and prosperity. Yet we've run out of our environmental capital. It follows that we need a different strategy, and this is highly important because we cannot go on destroying the environment. Currently we must find answers to several questions.

First of all, can we win a leading position on the environmental issue as well? At a conference in the Netherlands, three countries—the United States, the Soviet Union and Japan—evaded responsibility for the future of the planet, to put it mildly. I mean two points: global warming and CO₂, and hence the need to burn lesser quantities of organic fuels and preserve the ozone layer. As far as the problem of ozone is concerned, there is the Montreal Protocol but it will apparently have to be revised in favour of speedier destruction of all chemicals piercing holes in the ozone layer. I think we could adopt a more active position. This is inevitable for us. Discussion in the Supreme Soviet shows that there is a national consensus on giving environmental protection priority even over the economy. Our situation is worse than that of many other countries. It would be hard to name anything comparable to the Aral Sea disaster or some other things. But we've begun promoting new thinking even in military affairs. Our situation wasn't any clearer than the West's but still we took the initiative and the lead. I believe we could do as much regarding the environment. We must do it. This is one way of making socialism attractive. The developed world, the West, has begun to think in ecological terms. There is a material basis for that there. The main threat to power generation and the environment alike comes from developing countries and, to a considerable extent, from all of us here. If we say frankly that ours is not a very rich country and yet, all our economic difficulties notwithstanding, we give priority to environmental protection, it will mean a lot.

I would mention also that at this juncture we can advance the idea of using our rockets to launch American satellites. This is another example of problems requiring political solutions. American companies in Houston are willing to go along.

What can we offer the world at the threshold of the 21st century? A nuclear-free world that will not be easy to advance to. Besides, the concept itself requires continuous improvement. But it's an attractive concept, that of a non-violent world, an environmentally balanced world saved from ecological disaster. As for the economy, there is nothing particular we can offer. In the cultural sphere, we can make proposals in spite of all our huge problems. We must formulate our vision of the world in the 21st century from the point of view not only of its non-violent character but of its essence. The 20th century is known as a "brave new world". You will recall that Aldous Huxley wrote a book about it and that its title became a slogan relating to a world where man is controlled by powerful

organisations, a world run by scientific and technological progress, a world followed by humanity and leading to many catastrophes, such as we have experienced.

We must formulate what we think the 21st century should be like. I believe it is described as a world revolving around man, a world where cultural values of the past and culture combine harmoniously with new technology, communications, informatics, and so on; an intelligent world where the intelligentsia is no longer an intermediate section of society and where everybody is an intellectual to one degree or another; a world where everybody can look upon himself as part of humanity, for while it numbers five billion, this can be done thanks to present-day communications.

We've been doing something to this end. I strongly support what Eduard Shevardnadze said here about youth. A matter of no small importance in this respect is exchanges between schools and children. The beginning was modest but these physical exchanges increase ten-fold a year. They have now reached proportions where funding is needed at state level rather than at the level of diverse non-governmental foundations. What is the meaning of these exchanges? They take the form of ties between children, of joint summer or family work, which now exists between the Soviet Union and United States. Last summer we had some 25 camps, including camps in such cities as Magnitogorsk or Surgut. Next year we can have as many as 250. By the year 2000, we could ensure that 100,000 to 200,000 children become friends, and then they would create a different culture.

Friends knowing each other well would be an element of global culture and openness. This is a perfectly attainable goal made more so by the fact that schools are in the lead today. They have established electronic communication lines through satellites between 26 schools in Moscow and New York. We are now working with UNESCO and UNICEF with support from the Foreign Ministry to develop a low-orbit satellite network which would enable every school in the world to use it by means of very inexpensive radio models. I see the formation of this global intellectual culture in a new intellectual century as a big goal.

Academician Yuri Ryzhov, Chairman, USSR Supreme Soviet Committee on Science, Public Education, Culture and Upbringing: Science is bound to respond to the beneficial call made by the leadership of our foreign policy department. I support Eduard Shevardnadze's statement that we are trying to treat science like—well, like certain other social spheres, that is, to spend as little on it as possible. You may have watched on television last night an opera company performing in an arena built thousands of years ago. Last summer, "Aida" was staged in the same arena. The scenery was most impressive but it was just scenery. You can use scenery imitating pyramids but real pyramids are very expensive. We occasionally treat our science like scenery, trying to spend as little on it as possible. Nor is it a question of science along. We are probably trying to spend as little as

possible on our parliament, too, meaning the supply of scientific information—an attempt which may reduce even parliament to a kind of scenery for a show but not for real action.

This is just a brief preamble, and now for something more concrete. A new foreign policy line is making it possible to begin overcoming the years-long isolation of our science and education from the world university. A very important point was made today by stressing the need not only for scientific contacts but primarily for ties in the educational sphere because unless we do something useful to it, there will soon be nobody for our Foreign Ministry or other departments to consult.

Changes in our foreign policy have enabled even so closed an educational establishment as the Moscow Aviation Institute, which had not had a single foreign student for 30 years, to invite leading foreign specialists in recent years. Nor do I mean specialists from universities, for there are also specialists from NASA and other entities as well as people from the entourage of the President now in office, that is, people associated with defence and the aerospace complex. However we realise that we need something more than contacts on the level of adults, and so we've been promoting contacts with students. We owe all this to the changes effected in our country of late. We are already training school-leavers—future Aviation Institute students—in British colleges. This is a further fruit of the initiative on the part of our foreign policy department, in particular of the fact that its fund was opened to us for two years on Eduard Shevardnadze's initiative and it helped.

I'm afraid conversion is interpreted simplistically by many. Of course, we need a sound concept of it. Regrettably, this is the second time I've gone through conversion and witnessed the losses due to a simplistic view of it but I think even small bricks may be useful in this case. Mention was made here of non-traditional and renewable sources of energy. Even so closed an establishment as the Moscow Aviation Institute has found partners in this field, the field of wind power and other renewable sources of energy, and moreover, those are partners employed in the space complex of other countries.

Here is a further concrete point. I think it is becoming obvious that there is no hope of equipping our educational sphere with national products, that is, electronic computers, personal ones included. We cannot fully meet the requirements of this essential sector with national products in the foreseeable or even the unforeseeable future. We are now in a position in the context of cooperation with the United States to reach agreement on a real step towards helping us with this educational problem. Contacts seem to have been established with Western Digital, and I wish to stress that, if this is confirmed, it will mean that we can expect to obtain roughly 1.5 billion dollars' worth of equipment which would enable us to take a decisive and not just a local step towards meeting the needs of equipping the educational sphere.

Eduard Shevardnadze was right to say that there are no particular sciences such as have a role to play in diplomacy, for all sciences have such a role today except, of course, that the development of the humanitarian sphere must be given priority. The Soviet Union has no national programmes in the humanitarian sphere, and I think this is a mistake. We have 16 or 17 national programmes but not one of them is related to this sphere. I believe both the Academy of Sciences and the State Committee should consider drawing up such programmes.

Academician Vladimir Matrosov, Director, Irkutsk Computer Centre, Siberian Section of the USSR Academy of Sciences: I would say that we've heard an excellent paper opening up promising vistas for joint research by the Academy of Sciences and the scientific institutions of the Foreign Ministry. I subscribe to every word in the paper.

I'm a mathematician specialising in the theory of stability and control. All my life I've been concerned with developing this theory and with applying it to various systems, especially large-scale, complex ones involving diverse subsystems. We have already laid a theoretical groundwork for this. We also have information technology to support these things. And so it is natural that my remarks will concern chiefly problems of mathematical modelling, of analysing stability at both international and national level and developing decision-making systems.

I hardly need point out here the relevance of the problem of stability, particularly internal stability, or its influence on international relations. Eduard Shevardnadze says that we need objective, scientifically valid evidence to deal with these things. We've therefore agreed a number of investigations with the Diplomatic Academy. Its representatives visited our Institute, subsequently I delivered a paper at the Academy, and in the end we held a joint seminar. The Diplomatic Academy has set up a scientific method centre which is functioning on a voluntary basis for the time being. As a result of reciprocal contacts, we have ascertained that what is needed primarily is a theory of international relations which would be suitable for modelling. Such a theory exists already abroad but we must adapt it to our thinking so as to make it workable for us.

A further problem is that of developing global models. But the level attained in this matter to date is such that little would come of just grappling with a global model. The need is for experts concerned with the economics, ecology, conversion and other fields to work on their models professionally and then to link them together. It is on this principle that we are now drawing up proposals for launching a programme for fundamental research into international and national stability and its programming so as to have in the end a back-up system for strategic decision-making. Let me add for comparison that an international scientific project for global security and risk control is in the making at the UN today. According to unofficial sources, five million dollars is to be spent on the project over a period of two years. We,

too, should apparently set up such a research centre to coordinate these things at the Academy of Sciences. There should be a prognostication and analysis centre under the Academy Presidium. Oughtn't we to have within the framework of such a centre under the Academy or some institute a centre for international and national development problem studies? This kind of research is supported by many, including Academician Avduyevskiy, Chairman of the Commission for Conversion. Some 20 to 30 institutes are engaged to some extent in investigations which could be coordinated. That's speaking of consolidating forces at the Academy of Sciences.

In conclusion, I'm going to respond to your call, Eduard Amvrosievich, for counter-proposals by presenting one to you.

Vladimir Volkov, Director, USSR Academy of Sciences Institute of Slavonic and Balkan Studies: I would like to speak because events of the recent period have drastically brought to the fore at world level all that has to do with Eastern Europe, with the European socialist countries. It so happens that I represent the Institute of Slavonic and Balkan Studies. This is the traditional name of an institute concerned with the general and cultural history of the socialist countries of Europe. I wish to thank the Foreign Ministry for the interest in science shown by it for the first time in the 35 years since I began working at the Academy. As regards our problems, they have lately found a most noteworthy reflection in the work of the Scientific Coordination Centre. We have already carried out initial measures and initial situational analyses which I hope have benefited both sides.

At present cooperation with the Foreign Ministry's central apparatus is making fair progress as far as I can say and is guaranteed organisationally. But there are other levels on which we should foster cooperation. I mean primarily embassies. The situation there apparently varies greatly from region to region. I understand that things are in better shape in the Western sector. As for our embassies in European socialist countries, I don't think our cooperation with them is adequate. Embassies often refuse to be interested in promoting such contacts. They look at things in their own way, and the view they take is often narrow. They don't help us sufficiently and behave occasionally either as officials bound by protocol or as mentors. Yet there are useful things which they could learn from scientists.

We have accumulated a vast amount of knowledge that isn't drawn on. I mean concrete knowledge concerning those countries that cannot really be obtained anywhere else. Yet nobody shows interest in it. And this prompts me to make very specific proposals. I propose including in embassy lists of staff scientists to enable the Academy to send people abroad for, say two or three months to do fieldwork. I mean fieldworkers differing in age and line of research, nor do I think it would be advisable to send them for a longer period. First of all, that would help

embassies establish ties with scholars in the foreign countries concerned. Second, it would be useful for contacts between scientists belonging to, say, informal councils or groups of various countries and representing diverse territorial departments. Third, it would help produce concrete projects.

By the way, there are very many problems requiring attention. After all, we know that the socialist community abounds in latent conflicts. Consider the Macedonian question, the Transylvanian problem, all the problems relating to Hungarian ethnic minorities, Polish-Czechoslovak friction, not to mention the German question. The Balkans are a match for any tangle of contradictions. Hence it would apparently be wrong to restrict fieldwork to socialist countries, for you can view the European socialist community from different angles according to whether you are in the United States or Europe, particularly West Germany. Then, there are the Balkans or Turkey.

Let us see, for instance, what is worrying the Balkan countries, such as Greece, at the moment. It is the completely unforeseen development of Turkey, where a population explosion is coupled with a technological breakthrough. Turkey has a population of nearly 60 million today, and that figure is expected to come close to 80 million ten years from now. The country is becoming a mid-level industrial state. It is following the same path of development as South Korea. Emerging to the south of our country is a giant neighbour with unforeseen geopolitical factors. This deeply troubles Balkan countries. Bulgaria reacts painfully to this reality, which is one reason for their latest moves over the Turkish minority there. They weren't accidental.

This situation invites another conclusion and suggests a practical recommendation. We are doing a poor job of studying the situation in Eastern Europe. New political forces and trends have surfaced now in those countries. Each of them has its foreign policy concepts. This autumn we again have, say, a revival in Poland of the idea of a Polish-Czechoslovak confederation, and besides, suggestions are being made for the establishment of a Central European confederation. These ideas go as far back as the twenties and thirties. To deal with that region, we need to know its history. We have no single centre framing policy towards the region although the West does have such centres. Besides, it is necessary to take account of the views of these countries themselves, and I believe a united centre of some sort should be set up within the framework of the Warsaw Treaty or in some other way to carry out relevant historical strategic studies.

It was said here that, self-supporting being the word, the Foreign Ministry would like to organise its contacts with science in a new way. I'm all for this approach but it should be guaranteed somehow by contract, that is, by a basic agreement to be signed between the Academy of Sciences and the Foreign Ministry. I avail myself of the presence of the heads of both entities to make this

suggestion. Having such an agreement, we could carry cooperation further. Let me illustrate the need for a basic agreement. In 1988, the Foreign Ministry signed a treaty with its Czechoslovak counterpart. One of the treaty provisions is aimed at publishing by 1995 an encyclopedia of the history of Soviet-Czechoslovak relations. Our Institute will take care of the requisite research but we need subsidies. Yet when we said so we got nothing definite, with the result that no research has started yet.

Elgiz Pozdnyakov, chief researcher, USSR Academy of Sciences Institute of World Economy and International Relations: Our Foreign Minister's paper raises a whole number of important and pressing questions. As master of this fine mansion, he is entitled to ask questions that it is apparently our duty to answer. I represent the humanities here, meaning primarily political science, one bordering on diplomacy, world economy and international relations. Now how far is our science prepared to answer the questions put to us in the Minister's paper? I think this is a key issue. I fully agree that diplomats should be educated technologically as well, should know what thermonuclear reaction means and some other things besides. But a diplomat can hardly be called a diplomat unless he is versed conceptually in social evolution, that is, knows who we are, what we are like and where we are going. Otherwise foreign policy becomes mere reflection.

Is there such a concept? I strongly doubt it. Can we offer such a concept now? I doubt this too, because our social science today is essentially a replica of our society. The old is falling into ruin but the new has still not been created. This is just the trouble. We have no new concepts, no new categories, no new notions. Right now our Institute is conducting a seminar on the relationship between the formational and the civilisational approach. The seminar is bringing out any number of unanswered questions. Indeed, what is capitalism? Nobody has an answer ready for use. What is peaceful coexistence in present-day conditions? There is no answer. We will have to do a tremendous amount of work before we can offer answers to these questions.

Take the formational approach, for one. Let me offer some criticism although this may be improper. I recall the revolutionary proposition which Eduard Shevardnadze put forward at the scientific-practical conference in 1988. I mean his proposition that the struggle between the two systems is no longer the decisive trend of contemporary development. It was a revolutionary proposition in 1988 but events are unfolding so fast that it is becoming obsolete. Yesterday there was a meeting of the Academy of Sciences section of problems of world economy and international relations. It put these questions in very sharp terms. Basically, the majority was of the opinion that the concept of peaceful coexistence is old stuff now, a relic of yesteryear. This concept doesn't work any more because it flows from the formational approach. The formational approach is no good today and must give way to a civilisational approach except

that we don't know exactly what such an approach means. In other words, one thing locks into another and pulls it along.

I see an important task here. Speaking of the role of science today, we must admit that we have few people concerned with these problems, and besides, they proceed severally. Some of the speakers here voiced the idea of concentration, of creating what physicists call a piercing effect. We need "Rand Corporation" of our own that would concentrate forces harnessed to the solution of concrete, general or indeterminate problems. Today this is being done in various parts of the Academy of Sciences and in other Soviet institutions.

The most unpleasant thing for us is that, in working on problems of socialism, communism, the formational or civilisational approach, we hurt everybody's feelings everywhere. We really have even no opportunity to state our views freely. I see people's deputies here. Why, they are up against the same problem in the Supreme Soviet. They have only to utter the phrase "private property" for hundreds of people to feel hurt. Isn't that preposterous? We are talking about civil society, about creating our own civil society. But surely we can't talk about civil society and yet strip it of its essence, private property, which Marx described as the political foundation of civil freedoms. Hurting somebody's feelings is unavoidable but we must bear this in mind. It doesn't matter much if you hurt the feelings of someone who is lower in rank than you but hurting the feelings of someone higher up is a different matter, because, in that case you are likely to be called to account.

Vitaly Zhurkin, Corresponding Member, Acting Academic Secretary of the Section of Problems of World Economy and International Relations, and Director of the Institute of Europe, USSR Academy of Sciences: Our group of international institutes—they number nearly a dozen—have been cooperating with the Foreign Ministry for years, which means that we are in a more favourable position than others. The quality of this cooperation has undoubtedly improved in recent years, and I think this is recognised by everyone. Even so, I have a haunting feeling that we have not been doing enough because there are still untapped reserves.

I would like to comment briefly on conceptual work, which is a permanent component of cooperation between the Foreign Ministry and, say, the Institute of Europe, which I head. The shortcomings of the approach of science are typical in part of the Foreign Ministry as well. First among them is overcautiousness, a tendency we have not quite overcome yet. I agree that multiple approaches must be weighed in the course of discussion. But every now and again, multiplicity becomes with us a discussion on what is known. We are extremely cautious about analysing new phenomena which we have somehow canonised and are attached to.

To go back to an example cited here earlier. Our country advanced the idea of a nuclear-free world when, on

January 15, 1986, Mikhail Gorbachev made his Statement. The move won us tremendous prestige. This is unquestionably the most important objective of our foreign policy. But many of our scientists are under the impression that we are perhaps going too far in advocating a nuclear-free world today, late in 1989. They consider that with our economy in its present state, our policy still in a period of transition, and so on, it isn't clear what the status of our country would be in a nuclear-free world. How nuclear weapons influence our position in Eastern and Central Europe or how far they ensure stability is another important question that I think must be taken into account. The situation in China hasn't quite settled yet. And this implies that the problem also has an Eastern aspect. In the event of nuclear weapons being destroyed fast, the conventional arms race could surge high, completely ruining both our country and the Western powers.

I'm speaking of just one alternative. It seems to me that we ought to explore such alternatives with greater determination, and I must say that we raised this question more than once. We all heaved a sign of relief when Mikhail Gorbachev spoke at Strasbourg about minimum deterrence as a possible compromise—for what I believe would be a long period—between our idea of a nuclear-free world and the Western idea of deterrence. Of course, we are all in a state of inertia because four or five years ago we argued vehemently with many of our military experts and, indeed, many politicians who were against a nuclear-free world and said our country could not go to such an extreme. We've persuaded the other side but the political situation is changing continuously, and our conviction should not push us any further.

Now for another point. We are still shackled by many dogmas of the past. The theory of convergence is the most common and elementary instance. We denounced it. The phrase is still treated as bad language. Some are fearful of using it although there exist numerous theories of convergence and the most advanced of them, such as Galbraith's, don't conflict greatly with our present-day views. Galbraith's theory says that all highly developed industrial societies are characterised by a market, market regulation, active government intervention in the economy, democracy, pluralism, and so on. In other words, it says what we mean when speaking of the oneness of our civilisation, with every branch of this civilisation and our socialism, now in process of renewal, contributing their share, so that each of them will certainly retain its identity in this situation.

A further shortcoming of science is its extreme sluggishness. We must admit that it is also typical of many Foreign Ministry officials. Some time in the past, we arrived at consensus on the inevitability of reforms in Eastern Europe. But we all believed quite sincerely that they would take 10 to 15 years and would come about gently, advancing at a leisurely pace. Yet what happened was explosions, first in Poland and Hungary and then in the GDR, Bulgaria and Czechoslovakia. We may find ourselves in a similar situation in studying the problem

of German reunification. An article in *THE SUNDAY TIMES* said that the next few years would see the rise of Fourth Reich which would become the second superpower in the world while the Soviet Union would be gradually pushed into the background or would even disintegrate. The article is ruffianly to a degree, nor is there any serious evidence to support it. But we must study the questions involved whereas we—meaning scientists—show timidity. Naturally, this criticism also applies to myself.

I think our researchers and those of the Foreign Ministry should devote special attention as they cooperate, to a search for new forms. Some effort to this end is being made and has already produced appreciable results. Specifically, our Institute is cooperating with the Scientific Coordination Centre. We have set up a joint Centre for Mediterranean Studies. The Foreign Ministry was the driving force in this while we found ourselves on the sidelines even though afterwards we, too, joined in. The Centre seems to begin functioning.

Mention was made here of trainees. Our Institute has trainees in embassies. The system has begun functioning but to be able to send anybody abroad as a trainee, we have to prevail on the USSR Council of Ministers to allocate foreign exchange, which is extremely difficult, nor can the Foreign Ministry do it for us. We've secured some foreign exchange. Two members of our staff have gone abroad for three months—one of them is in France now and the other, in Britain. Yuli Kvitsinsky is willing to admit trainees to the Embassy in the FRG for two or three months, and this also goes for Boris Pankin in Sweden and Felix Bogdanov in Belgium. In other words, the system is beginning to function. Tasks are assigned by Vladimir Shustov of the Scientific Coordination Centre and by the Institute of Europe. We think it will be necessary to see some time next summer or autumn how the system works, to analyze it, to ascertain how effective it really is.

I believe the Foreign Ministry ought to help us in organising international cooperation in various forms, in recording it in major government documents. For instance, our Institute has signed an agreement with the German Foreign Policy Society in Bonn. The Society is the main research centre of its kind in West Germany, something like the American Council of Foreign Relations. It is a large organisation. The agreement was put down as one of the results of Chancellor Kohl's visit to the Soviet Union. The two sides held in a fairly short time a forum attended by 30 people from our country and some 50 West Germans. The President of the FRG sent a message of greetings, and the forum was addressed by Genscher, Dregger, Lamsdorf, Vogel and several cabinet ministers. The first work is ready and will be published in West Germany first and possibly in the Soviet Union afterwards.

My last comment is this. I am sure we need consistency in adopting new forms. The scientific-practical conference held by the Foreign Ministry in 1988 was quite a

revelation and even an outlet, if you will, an opportunity to speak out on many sore subjects. I realise the difficulty of organising such major actions but still I think if another such conference were to be held in 1990 or perhaps 1991 to sum up results and provide an incentive for the future, it would be very useful.

All that we are discussing here is closely linked with our inner political affairs as well. Personally I feel that our country, which is passing through a difficult period, is now faced with the imperative task of consolidating the forces of all perestroika supporters. I'm pointing this out because it is typical of many of us who clash over various petty issues and may be said to insist on their individual points of view that they do little to search for a common ground. I don't know how this front of perestroika supporters should be consolidated, that is, whether in the course of preparations for the 28th Party Congress, in connection with the work of the Supreme Soviet or in some other way. Personally I'm very much in favour of consolidation in the course of preparations for the congress and of the subsequent implementation of congress decisions. But it seems to me that the foreign policy section of a relevant platform should play a very big role in working out that platform because, first of all, it is in foreign policy that our country and its perestroika have made particularly noteworthy gains. Second, there is an all but universal foreign policy consensus in the Soviet Union. I regard this as a tremendous achievement of perestroika. It is the approach to foreign policy matters that could provide some common ground for the forces supporting perestroika.

Vladlen Martynov, Corresponding Member of the USSR Academy of Sciences and Director of the Academy's Institute of World Economy and International Relations: The central issue is that we are living through a crucial period of transition. This is in evidence in both our country and other socialist community countries, Romania for one, and it imposes special obligations upon both science and all political organisations, which must grasp the meaning of this transitional period. Now while science participated in evolving new thinking, it did not play the chief role. It was the leadership and the Foreign Ministry that worked out new political thinking. True, researchers had a share in planning this approach but it was not science that achieved a breakthrough. Today, when new thinking has earned the Soviet Union high prestige in the world, in all countries, it needs to be carried forward. A turning point has come in this as well, primarily because we have fully not worked out our concepts. Our interpretation of contemporary capitalism is a case in point.

Even the Party Programme contains things copied from 70-year-old programmes. How can we conduct the dialogue if we describe capitalism as "dying", "parasitic", and so forth? It is perfectly clear that capitalist development followed a new direction from the 1929 crisis onwards and from 1932, when Roosevelt began implementing his New Deal and when the Social Democrats came to power in Sweden. Science has yet to make a

proper appraisal of this, and so we cannot now talk about universal progress or a civilised approach without a reassessment and a real knowledge of what contemporary capitalism stands for and why it is now a factor for the progress of civilisation. We lag behind in this.

And what about socialism? The fact is that we persist in criticising the West and reject certain things being done there. Yet the focal problem for us today is to evolve a concept of contemporary socialism. We talk a lot about what Stalin's model of socialism led to. Scientists are already at one on this. But what is the new model of socialism to be like? What will its values be not only in the moral but primarily in the cultural sphere? Lastly, how is scientific and technological progress to go on in our country? After all, the important thing is that, in spite of all our discussions and efforts, it is in this field that no revolution has come or can come about with culture and science in their present deplorable state.

It is a scandal that senior researchers do not earn enough to feed their families. As for youth, I am at a loss for words. You cannot imagine how hard it is to stop young researchers from quitting because gifted people are in high demand and may be lured away by anyone without your being able to stop them. Thank God we at the Institute have an outlet: we can occasionally send people abroad but, of course, this is a very small outlet. One day I brought together the cream of our staff to ask which of them had been to capitalist countries. They turned out to make up 60 per cent while the remaining 40 per cent said that they had never made business trips abroad although they are students of capitalism. There is not much the Institute can do in the way of trips abroad because it is allocated a mere 4,000 dollars a year and has to carry out all other exchanges on a currency-free basis. Of course, we have been doing a lot just the same, so that our ties are expanding fast. But even currency-free exchanges are threatened now, and we wonder how this can be remedied. We have spent 290,000 rubles on tickets alone, and now that tickets are going to cost 50 per cent more, we have no idea at all how we will manage. This is why I believe we need further cooperation on this with all and should realise that without progress in science and culture, our society as a whole cannot make headway, either.

A related problem is that of our attitude to the third world. Nowadays representatives of the third world criticise us openly. I am a member of the Council of the UN University, which represents mostly third world countries. Everybody on the Council says we have no clear policy towards the third world. This is a very big problem. Indeed, how is that backward world with its extremely acute problems going to take the road to civilisation? How can this be brought about? Is it possible that we are in for immense catastrophes because we are very few compared with the others, to paraphrase what Alexander Blok wrote? I am sure we need to devote greater attention to these problems.

Now for cooperation with the Foreign Ministry. Although we get few contracts from the Ministry, it emerges that over the past year we have prepared 41 information items for Deputy Ministers and one for the Minister. We have a stake in this cooperation. Our relations with the Foreign Ministry take the form of participation in practical work, and it is very important for us to know the Ministry's opinion of the information we provide and the proposals we make. But there is still little feedback. Nikolai Inozemtsev, one of the founders of the science of international relations, always stressed that it was a science interlinking many sciences: economics, politics, history and law plus diplomacy, which actually maintained international relations. We will be unable to go any further without generalising this work.

Speaking of conversion, I do not think we can discuss its problems at the moment because we lack concrete information and a concept. We have a group concerned with conversion and are participating in common with other institutes in working out these problems but there is no concept of conversion, is there? Some arms plants are made to turn out pans. We are wasting a potential which we could draw on to modernise the economy. On the other hand, we get no information from the military. A huge number of plants are manufacturing nothing today, being something of an emergency reserve. Nobody is talking about saving money on conversion. We are tackling the problem since late 1970 although we were banned at the time from holding a symposium with the Americans working on the same set of problems. Nevertheless, it is clear that conversion itself requires funding, especially at the early stage. We must see to this openly, which means that scientists, economists and, above all, military experts must join efforts. This is the only way to get off to a start.

Boris Topornin, Corresponding Member of the USSR Academy of Sciences and Director of the Academy's Institute of State and Law: We who specialise in international affairs and law have plainly given in to a certain euphoria by imagining that everything is all right and there are no problems. And so we are concentrating on preparing a five-volume manual of international law. I wish to call attention to the fact that we need aid, support and initiative from the Foreign Ministry in cooperating on problems of our internal development. We know full well that our achievements on the international scene depend to a considerable extent on fruitful effort by our diplomacy but are restricted by the present state of our society. If these difficulties go on mounting, we are bound to lose in foreign political prestige, and what is more, too much emphasis on foreign policy may be interpreted as an attempt to get away from the solution of domestic problems. I will not touch on all problems, such as the theory of socialism or the theory of political development. I wish to dwell on problems arising from our international commitments.

First of all, we have assumed obligations under many documents, in particular documents of the Vienna Meeting. But it turns out that while we now have this

document and internal legislation, there is still no mechanism to link the two systems together. We have no mechanism at all to register what we have accomplished in the area of international law, what should find a reflection in our internal legislation or what we should keep an eye on. The result is contradictions.

Second, we should see to bringing our legislation into line with our new commitments. We could proceed to draft new laws in addition to the ones that have been or are to be passed. I mean laws on entry and departure, freedom of conscience, freedom of travel and many other laws which we need if we are to fully meet our obligations—say, a law on the legal status of foreigners.

Also, we should write the primacy of international law into our Constitution and make it a principle. And, again, we must work out our own approach. There exist various decisions in the world: there is recognition of the universal principles of international law, recognition of standards of international law, as in the Constitution of the FRG, recognition of none but treaties signed between states, as is the case in, say, France. Obviously, we need to work out our approach in very great detail because we must realise what the primacy of international law means. It should obviously be a question of treaties on matters of principle that have been signed and have passed by the Supreme Soviet, and as for the rest, the Constitution should probably refuse to consider it binding on our standards.

One of the problems is the economic aspect of law, the problem of development. We have neglected it, and therefore we all encounter many difficulties. Over 1,000 joint ventures have been registered in our country to date but very few of them—from 200 to 300—are actually operating. There is no mechanism making the enterprises involved responsible to our side. Worse still, it cannot be provided just yet because we must first reform many aspects of our legislation, especially mortgage law.

The problem of a European legal area is one of those facing us today. We have already conferred with the Institute of Europe and plan to cooperate with the French. But this is still largely unexplored ground, and we must stop to think about the direction of our advance. On the issue of a European legal area, the best solution now is apparently to follow two lines: one, the environment, because we can work out common standards and sign joint conventions, and two, economic legislation, which is needed if our systems are to move closer together and mediate our economic ties. We should therefore like to win support for this initiative.

Research into both international and European law is not seen as a priority today, yet while the problem of European law and cooperation with European organisations is very important to us, it is now the West that initiatives come from. What is more, Europarlament has invited us to cooperate with it in working out these problems and carrying out joint actions.

Alexei Yablokov, Corresponding Member of the USSR Academy of Sciences and Director of the Academy's Koltsov Institute of Biology, People's Deputy of the USSR: I'm one of the scientists who have become politicians, as Eduard Shevardnadze put it. I was educated as a zoologist but am in our parliament now and have it decided to devote my energies for a time to environmental protection. You may call me an ecopolitician or political ecologist—just as you like.

It is indicative that the Foreign Ministry and its leadership—meaning not only Eduard Shevardnadze but Vladimir Petrovsky and on all levels, as far as I know—are coming to face up to environmental problems. Appraising the situation, I would say that the Academy of Sciences is also trying to face up to environmental problems but that is as far as it goes. The Foreign Ministry has already turned to face them and has perhaps become a political leader with regard to our environmental problems. This prompts me to ask it to help us solve our internal problems.

It was repeatedly said here that we must solve domestic problems which limit our foreign policy activity. What is the world's reaction to the environmental situation in our country? Goteborg recently hosted an International Ecological Congress and a symposium which I attended. The symposium was devoted to the ecological challenge of Eastern Europe. The world sees the scandalous state of the environment in the Soviet Union as a challenge posed by us to the whole civilised world. We must understand this. Words alone won't help. We must use the understanding shown by the Foreign Ministry to make our other ministries do what they should have done long ago. Departmental monopoly is one of the main reasons for the ecological troubles of our country. It is necessary to work hard in this direction. But to coordinate this effort, we need a group responsible for the strategic planning of foreign and home policy. We must not only plan our foreign policy but know the trouble spots of our home policy.

Many speakers here rightly pointed out the need for consolidation. I fully agree with them. But if we put off consolidation until the Party Congress meets, we are bound to miss many things, just as we have now missed the problem of a Union treaty. Whereas six months ago we had no difficulty discussing a Union treaty or a Federation treaty, today we are up against enormous obstacles because now the issue is a confederation. This is what happens when you miss an opportunity. We can't wait until the congress is convened. We must by all means seek consolidation on every line.

I would ask you to pay greater heed to what is going on in the Supreme Soviet right now.

Science is often unprepared to help in solving political problems. For instance, we are all talking about global warming, the climate, and so on. Why did Bush take so evasive a stand on steps to curb various emissions? Because, scientifically speaking, it is not really quite

clear whether the greenhouse effect is due solely to emissions of fossil origin. Two years ago, Corresponding Member Zavarzin published in our country a small article containing, however, ample factual data. The article demonstrated that the greenhouse effect is due mainly to processes taking place in Northern Eurasia and somewhere along the US-Canadian border. Something seems to affect microbiological communities in the soil. Zavarzin estimates that the ploughing up of large tracts and the felling of forests do more to produce greenhouse gases than emissions of fossil fuels. The article appeared two years ago. But it is as if the Academy of Sciences had never seen it although it deals with a decisive problem of international politics. I mention it at every meeting but nothing happens. Sometimes we don't even know what our colleagues are doing. The article is worth calling a scientific conference.

The third world has begun criticising us, we were told here. The amount of resources and energy consumed per head of population in developed countries, including ours, doesn't apply to the whole world. What I mean is that if the amount of energy and resources (iron, manganese, and so on) that we all consume were to be extended to the population of the earth and hence to the third world, the planet couldn't sustain it. According to estimates, one Swede "equals" 200 inhabitants of the third world, one American is the "equivalent" of 70 and one Soviet citizen, that of some 20 people in the third world. How to solve the problem? We cannot say simply that all third world countries will consume more and more energy or produce more and more, because this is impossible in terms of global modelling. The only way out is to reduce energy and resources consumption in all developed countries while keeping up the high standard of production existing there. The Americans have shown that this can be done. We, however, don't even give serious thought to the problem and are naturally criticised for this by the third world.

Production of protein vitamin concentrates based on petroleum paraffins has reached a critical political level in our country. You know all about Kirishi and Angarsk—the strikes, new diseases, and so on. Concentrate production must be banned. But the Council of Ministers says we must produce those concentrates because we have sales treaties with Finland and Holland. We need information on these matters. Embassies should be asked to find out what other countries have done in this respect. I know that Sweden has banned production by legislative act and that Finland purchases the product from us. We had to ask the US Embassy, the Swedish Embassy in the Soviet Union, TIME correspondents. They promptly supplied us with information. The result? Finland buys the product to feed cats and dogs while we put it out to feed our people.

We need prompt information. The West commands a large scientific potential. We could rapidly realise that potential through our embassies for the good of our people. We need a communications system, such as would enable the Supreme Soviet to get information

from embassies without delay, without going through various levels or sending letters.

Academician Yuri Osipyan, Vice-President of the USSR Academy of Sciences and Director of the Academy's Institute of Solid-State Physics, People's Deputy of the USSR: There are certainly very many concrete problems which all of us here would like to discuss. Every one of us has his sore subjects, and all who are engaged in a definite sphere are ready to discuss their problems at once. But still I would like to return to the theme of this meeting. I mean the strategic issue of the interaction of science and all of our foreign policy spheres. I see the main problem as that of a concept. There is no doubt that Soviet science now has every opportunity to accomplish this task. I don't think our science can "keep out" any longer, saying that this or that cannot be done because it is forbidden or inadmissible, or because there are no possibilities. If there is any overcautiousness it will be our fault. We must stop "keeping out", I think we are in a position to concern ourselves unhampered with the social sciences in the same way as we have been doing in the case of the natural sciences. I believe the Academy of Sciences should set an example by getting to work to show what our researchers can do.

There are unquestionably numerous opportunities for cooperation between foreign policy and the humanities. But as a specialist in the natural sciences, I wish to call your attention to current scientific and technological problems. I suppose it is now very important for foreign policy workers to realise that in analysing world developments, it is necessary to move from particular theoretical questions to strategic evaluations of trends in the natural sciences which can not only demonstrate practical changes but bring about a complete turnabout. The Foreign Ministry—its central apparatus—can rely on our possibilities in this respect. In fact, there are some examples of how we are cooperating on the disarmament problem. I will not cite them here. But I would like to comment on the work of embassies.

The main scientific and technological line of work in embassies is still analysis of concrete things, collection and analysis of concrete information. An end must be put to this stage. Our embassies in all major countries should have people who can analyse scientific and technological information and enter into contact with the top section of the scientific community. We have already discussed this matter with the Ministry leadership. Both the Ministry and the Academy of Sciences have taken some concrete steps. In any case, we now have someone in the United States who can do that. But no turning point has yet been reached, and besides, there are technical difficulties. I therefore ask the Minister to see to it that people who find themselves involved in foreign policy activity get support.

We have discussed this with Yuli Kvitsinsky, for West Germany belongs to a sphere which calls for strategic analysis from the scientific and technological point of view.

There is also a further possibility. We have among our scientists experienced people who enjoy a good reputation in the world scientific community and can be leaned on for support. We who have been engaged in scientific activity for 30 years have our own ties, channels and colleagues who influence even the leaders of their countries. We are in a position to influence through them both public opinion and decision-making. And so I believe the leadership and apparatus of the Ministry should take this possibility into consideration. We must cooperate more closely and fruitfully.

As regards concrete forms of cooperation, I think they are worth discussing. We will evolve a permanent system so as to work together, so that you can have our analytical backing, turn over to us problems you think about, because the signing of any agreement should by all means be preceded by a long-term analysis. As it happens, science can produce such an analysis.

Academician Konstantin Frolov, Vice-President, USSR Academy of Sciences, People's Deputy of the USSR: I would like to offer some comments. Eduard Shevardnadze's paper is very critical with regard to science and the Academy of Sciences. This is something we all need.

But the paper contains no adequate criticism of our diplomatic service or our cooperation, or staffing. I believe we can make up for that when we hold a joint meeting of the Academy Presidium and the Foreign Ministry.

Second, the impression being created in our country and spreading beyond is that our science is half a century or a whole century behind the times. What science? In what field? And how is one to gauge the lag? All of us here participate in major international congresses, symposiums, conferences. We recently held a big conference on what is known as non-linear phenomena. It was a question of the stability of systems, of trends in physics and other natural sciences, and in society. Leading world scientists commended the Soviet participants' papers as the advanced ones. To the best of my knowledge, we have never looked like savages at any congress or symposium on the natural or technological sciences. I'm sure diplomats, participants and witnesses would be willing to bear me out.

The point at issue is something else. We lag behind others in putting scientific achievements into practice. But this has nothing to do with scientists. Yet attempts are made to present a negative picture by declaring that our science is 50 years behind the times.

That is completely wrong. But the phenomenon regrettably exists in our society. We must stop taking a negative view of scientists and the Academy of Sciences. Scientists are the only ones today who can lead the country out of the crisis affecting it.

A word about conversion and secrets. Currently the West is ready to cooperate actively with us, to talk with us, to study those of our achievements that really meet high

standards, up to the point when it comes to setting up joint ventures or high technology. I have a feeling that it's now very important for us to continue discussion with due regard to the upcoming summit discussion.

Not long ago, I was in Chautauqua, USA, where I read a detailed paper on the history of space exploration in our country describing the development trend of our relations with the United States. I told my audience how we had worked on the Apollo-Soyuz project, how it all had gone on, how such things are blocked now and who is behind it. The blocking is being done by the US administration. I talked to people in Congress and discussed the matter with the NASA leadership and the US national foundation. As soon as you make a specific suggestion, the administrative bureaucracy virtually bans firms, scientists, people keen to cooperate with us from doing so, primarily in the ecological sphere (Corresponding Member Yablokov spoke of that here), in the sphere of atomic security, atomic reactors, on an equal footing. Americans are familiar with our achievements in technological diagnosis and other fields. But the administration discourages them from cooperation. Why do we stress all the time that we are carrying on perestroika at home, combating red tape and the command system in science and other fields yet don't urge the United States to revise its stance?

I get many telex requests for help in removing a control or lifting an embargo. Americans tell us that they want to cooperate with us in the light, food and textile industries. But it is more than American scientists can do to overcome curbs imposed by their own country.

Now for conversion. It is true that we have no scientific concept of it at the moment. We've set up a commission under Academician Avduyevsky, an experienced specialist in space exploration. The commission has begun working. Our efforts in the area of conversion are understandably being watched by the Americans and by Western strategists generally. The further we go in this activity, the easier it will be to come to terms on the problem of the curbs I've mentioned.

But as matters now stand, we can't simply say, "Down with all secrets!" Secrets—state, professional, economic and military—do exist. They are and always will be there. The point is, however, that we usually classify all that finds itself inside the walls of a defence plant. We buy an American machine, and it becomes secret for everybody. We give very many people access to secrets, which cease therefore to be secrets. It's impossible to keep every trifle thing secret. However, the press occasionally reveals information and figures that should perhaps have been withheld. We apparently need to form a joint working group of our Commission on Conversion, the Foreign Ministry and our economists and to draw up a precise work plan for the current year. It would be wrong to say simply that we've so far been making missiles but will be making something else from tomorrow on.

Let me illustrate. One of the speakers mentioned the science of materials. We do lag behind the United States but what we lag in is the use of the results achieved by this science, not in the science itself. We can't make hockey sticks, ski poles, composite rackets but the rocket airframes we make are no worse than those of American make. When we will be able to use this technology in our country is another matter. Don't let us imagine that we have only to say so for a plant which makes rocket airframes or aircraft of composite materials to start overnight turning out any consumer goods. This kind of transition requires technology, cooperation with Western firms and a degree of trust.

Academician Igor Makarov, Chief Scientific Secretary, Presidium of the USSR Academy of Sciences: Our international policy and initiatives have made our country more open in every sphere, including scientific activity. But this openness is more like a one-way street. Foreign countries are using it considerably more than we. This raises a whole number of, say, information questions that require close, serious attention.

We lack up-to-date facilities and cannot even call up our foreign colleagues in time to get information we need. We cannot invite prominent specialists in the social, political, natural or other sciences to the Soviet Union because we can neither accommodate them properly nor provide them with the requisite facilities for work. Now is the time to revise the problem of publishing our works in foreign periodicals. We should take a close look at the activity of the All-Union Copyright Agency as well as at, say, the problem of making copies of scientific publications.

I also think our cooperation with the Foreign Ministry should be put on a more permanent and more substantial basis. Suggestions were made here for the Foreign Ministry's Collegium and Academy Presidium to hold joint conferences, and I believe we should sign an agreement on cooperation between these two entities in those fields of knowledge in which the Ministry needs it.

Going back to conversion, I wish to make a proposal or put a question if you will. We have quite satisfactory contacts with the American scientific community, our ties have expanded considerably, we have good agreements and meet frequently to discuss various important subjects. There is a growing awareness among influential American scientists and businessmen that a successful perestroika and an increase in our international influence are also of vital importance to the United States itself. They, too, are wondering about what was mentioned here: what if a new Reich emerges? Were this to happen it would raise questions about Silesia, Pomerania, the Sudetenland (I am using words uttered by American scientists). Our political initiatives are prompting the United States to decide to cut military spending in the next six years by at least 180 billion dollars. It seems to me that there is an opportunity now

to use economic, scientific and technological ties with the States more extensively for stabilising our economic growth.

As far as I can say, the United States looks on the Soviet Union as an earnest of preventing political and economic destabilisation processes in Europe that would imperil the interests of other countries, including those of the United States. Lastly, the urgent global programmes that were mentioned here, such as those relating to environmental protection, natural disasters and many more, could not be raised to the right level without the Soviet Union. And so I believe it would be realistic to propose cooperation with the United States on the same scale as the Marshall Plan in the case of the West, meaning a different plane, of course.

To work out concrete proposals, we should form two or three parallel groups of Soviet and American experts and work out specific projects. (I am not a politician and do not consider myself knowledgeable enough on this but I wish to state my opinion.) The experts would include representatives of our Academy of Sciences. We should set a schedule for the groups' work and evolve a concept regarding conversion in the United States and the political views on it current among American scientists and businessmen.

Yuri Sayamov, Deputy Chairman, Committee of Soviet Scientists in Defence of Peace, Against the Nuclear Threat: Our Committee was set up in 1983 as a group of scientists keen to take part in work on pressing problems. In 1988, it was granted the status of an independent national non-governmental organisation having an apparatus and, more importantly, because there had been no precedent, a research centre.

In addition to a traditional problem, disarmament, we now have environmental protection and security problems, energy and economic problems as well as the moral and ethical problems of global security. This last line, which arouses a particular interest, has already been the object of joint projects at the level of both the UN and UNESCO. Present here are many members of our Committee, and the list of those nominated as candidates for election to it at the Third All-Union Conference in March 1990 includes several diplomat-scientists.

Eduard Shevardnadze spoke here of the importance of having an extradepartmental scientific examination centre. We would like to offer our services. The Committee of Soviet Scientists would be prepared to function to the best of its ability as such an independent public examination centre doing research, in particular with foreign participation, and carrying out international research projects. Our foreign partners, including such major entities as the Carnegie and Rand corporations, the Ford, Rockefeller, Eisenhower and other foundations and the Federation of American Scientists, practically all the leading research centres in the West, are willing to help us in providing such a centre with ampler opportunities for research.

Academician Gury Marchuk, President, USSR Academy of Sciences: I wish to answer some questions and touch on some problems. I stated my vision of problems in the paper I delivered to the conference held at the Foreign Ministry in 1988. I now note with satisfaction that our Council, a product of that conference, has begun functioning.

Eduard Shevardnadze's paper contains a useful proposal saying that we should translate cooperation between science and diplomacy into conferences and other meetings on specific themes and even joint meetings of the two entities. I fully subscribe to the idea and think we could devote the first meeting of that nature to a programme covering the biggest problems that have already been put. We heard about many of them here, many others were not stated but all of us here are their exponents. I therefore wish to make a concrete proposal. Now that there is a Scientific Council, many comrades want to put forward their problems or are already doing so here. Let us first pool our ideas. I don't mean departments but experts whose leaders are present here. Let every one of them write down his proposals, and let us examine them. I'm sure they will provide a basis for future agreements between us.

Speaking of the involvement of science, the whole international experience of the recent period indicates that attention is focussed on global problems of the planet and on various disasters, including ecological ones. I think this is what we need to realise first and foremost. Now disasters are the effect and as for the cause, it may be a natural calamity or a nuclear war, anything that was mentioned here, or, say, major accidents that could assume global proportions.

I think the latest technologies are one of the new problems which we must work on and solve. We are not yet prepared to cooperate with the world in this field but have already reached a stage where we must do so. The only obstacle is that our economy has yet to draw on international achievement. If we make headway on this by pressing forward with the perestroika in our economic and political system we are now engaged in. I'm sure we will be able to deal with many problems on an equal footing with the West. We have already accomplished a great deal but we'll have to do much further work.

Our embassy staffs should include intelligent and serious people—mostly young men and women—who could shoulder the task. I'm somewhat disappointed that the embassies I've had contacts with do not make proper use of their potential. They mostly use their attaches and other staff members as technical personnel subbing for others by, say, meeting and seeing off people. Of course, this is also important but it takes up a lot of their time. They play no real role. I suppose this could be discussed specially.

We need a person of higher rank. I mean a counsellor assisted by one or two people relieved of any protocol

functions and concerned with surveying and coordinating all projects. That would help get things done. We are ready to offer you maximum assistance on this in terms of personnel. I support the proposal for an extradepartmental scientific examination centre, which was called "strategic" here. Let us think about the best way to go about it, because all that is being done in our country today is either imaginative or unimaginative and unsupported by any social idea. Supreme Soviet commissions have effected a change but there seems to be a need for a further reciprocal organisational form. Our Council may become a centre with cells forming around it, which would be very correct.

I stand for an agreement between the Foreign Ministry and the Academy of Sciences. My colleagues spoke well about it here.

Our work will be effective provided there is a source we can draw on for funds. We've entered a period when we must earn money by doing research. The Foreign Ministry has led this off. I therefore suggest setting up this year, by way of experiment, a research fund, a fund of the Scientific Council, and ensure that the Academy of Sciences, the Committee on Science and Technology, the Foreign Ministry and other entities contribute to it. Let it be 500,000 roubles to begin with. It would be spent on our own research. We would put up money but would also earn it. The effect would increase tenfold as a result, as experiments you and we have already carried out indicate. I believe the Academy could plan to spend one million roubles a year in the next five-year period, that is, given money to the Scientific Council and earn money by solving concrete problems. It would mean self-development.

Very considerable alarm was expressed here over the absence of an ecological programme. We must carry out the proposals which Mikhail Gorbachev put forward at the United Nations. Those were far-reaching proposals for, first of all, global ecological monitoring. But there is no real progress for some reason even though UNESCO and UNEP take a positive stand. I think we need to show initiative on this point and should do so with great vigour.

Another proposal called for the establishment of international ecological security centres, in particular in the Soviet Union and Europe. Perhaps we should show initiative by basing such a centre in our country. It would be a very good idea. As regards ecological programmes, we are still at the beginning. But we think we've already taken a big step by drawing up a programme and submitting it to the State Committee on Nature Conservation. The sectoral programmes now under revision are all to be patterned on this one. The Supreme Soviet seems to have allowed or is going to allow some more time for this.

I'm thinking of the third world. We generally refer to highly developed countries in discussing various problems but here's an avalanche of new problems of the new

world bearing down upon us. We must be careful not to neglect contacts with India, which we are trying to preserve and extend. This also applies to our contacts with Brazil. Eduard Shevardnadze said that on a proposal from him, the Central Committee had decided on a trip to Brazil by a group of Academy scientists. Why, that is half a continent. I was struck by the fact that Brazil ranks third in world trade turnover after the United States and Japan. But it spends 80 per cent of its earnings on interest payment. However, there is an amazing process under way. The Academy of Sciences is going to play host to a large team of Brazilian scientists and public figures. They say that Brazil's trade turnover has undergone a drastic restructuring. Formerly 80 per cent of it was carried on with America. I was surprised to learn that currently America accounts for a mere 20 per cent, Europe for 45 per cent and Japan for the rest. Brazilians say they want to cooperate with us. That's a new tendency. We've been speaking of global problems and forecasts here. That is what our country should concern itself with, and I think the Academy can play a useful role in it.

Boris Grushin, Deputy Director, National Centre for Public Opinion Studies on Socio-Economic Problems under the All-Union Central Council of Trade Unions and State Committee on Labour and Wages: I would like to return as a sociologist and philosopher to the general formulation of the question of the possibilities—or the difficulty to be exact—of using the social sciences in the activity of the Foreign Ministry and, indeed, of other social institutions of our country interested in using the results of research in that sense.

First of all, the social subjects, organisations, groups and individuals now taking a real part in the deepening of the perestroika process have a big stake in scientific substantiation of their activity, specifically through authentic information on the processes going on in the country.

It is these social subjects and hence perestroika itself that are badly short of such social knowledge and such information. I mean the gap in scientific knowledge and scientific concepts, in particular at the level of empiric information about our society as a whole.

From the point of view of social science, we are still living in a rather dense forest abounding in unexplored areas and criss-crossed by mysterious paths and roads. This is also true of empiric information.

I wonder how many opinion polls are now conducted in our country. Every single day the press carries reports of surveys made by some agency, group and Heaven knows who else. I insist, however, that in nine cases out of ten or possibly still more often, we're presented with absolutely unreliable information if not outright misinformation on the real state of affairs and mass consciousness in society.

This raises a fundamental question: Why is it that, now as in the past, the supply of serious social information within the framework of scientific production is made

difficult? I believe there are two circumstances which we mustn't and can't discount. One of them is that many administrative structures, including some of the highest, I'm sorry to say, still have no interest in scientific information on our society. We can't shut our eyes to this. The Foreign Ministry is a noteworthy case in this respect. Someone said here that it had turned to science for the first time. I've been cooperating with the Ministry for at least two years now and can tell you that it turned to science long ago and has been trying to benefit from it. This is an obvious exception from a general rule. We daily witness administrative bodies at various levels completely ignore results of scientific research. True, they don't do so openly, for it is now profitable and fashionable to talk about reliance on science.

Let me tell you an amusing story showing how things really stand. We are doing fieldwork in line with a major Soviet-American project tentatively called "Television and Society". It has to do with research into public opinion. Everything necessary was done for one of the stages of that fieldwork to take place in Uzbekistan according to representative all-Union selection. Two American professors were to have gone to Uzbekistan. Three days before they were to fly there, we had a telephone call from the chairman of the Uzbek trade union concerned (for the project is sponsored by the All-Union Central Council of Trade Unions). He told us that no fieldwork would be allowed in the republic, especially fieldwork involving visits by American professors. And so nothing came of the whole plan. Please don't mistake this for a curious incident, because it may be classed as a perfectly normal occurrence in the activity of the national centre for public opinion studies.

It was rightly pointed out here that at the upper levels of our science, including sociology, philosophy and political science, we do quite well at international symposiums, conferences and so on. But then it isn't this thin top layer that "makes" science. This is done by the middle layer. Yet the situation is very tense in this respect.

What stands in science's way? I've come to the conclusion that there persist two circumstances. First, in the previous 50 to 70 years since the rise of our society, real social science was reduced to the minimum. I regret to say this is an objective fact. Social science was driven underground or forced onto the periphery of the process of producing social knowledge. Real social science had to give way to a phenomenon known as a quasi-science or "almost a science" and having all the outward attributes of a real science: academicians, corresponding members, doctors, social structures, habits, and so on. Everything made it look like a science but it was something entirely different, something designed to serve as a substitute for social science. Of course, the situation is changing now but the two main qualities of this quasi-science—lack of professionalism and lack of independent judgement—are still there.

It was said here that all bans had been lifted. That's a naive statement to make as far as social science is concerned. The problem isn't external bans but the inhibitions of people active in social science. They are as dependent as in the past and have as much difficulty expressing their independent views as formerly. The existence of an external censorship is a further handicap.

Anatoly Gromyko, Corresponding Member of the USSR Academy of Sciences and Director of the Academy's Institute of Africa: I believe one purpose of this meeting is to indicate ways and means of more effective application of the basic knowledge we Soviet social scientists possess. Today's world is highly complex and dynamic and is developing fast. The need for a deeper-going study of formations has already been mentioned here. I agree. It seems to me that the Academy of Sciences underestimates the function of social science.

Take the formational process as an example. Marx analysed capitalism. He didn't really analyse the socialist society to come even though he often mentioned it. Nor did Lenin make a detailed analysis of it. And so now we are in fact marking time. In any case, we don't make much progress in trying to grasp our times. I think the reason for this is the law of correspondence which we worshipped for a long time while at the same time forgetting another Marxian law, that of value, and this tells now.

We have yet to grasp in today's conditions the law of correspondence, which analyses production relations and productive forces, formations and the natural predetermination of movement. I believe mass consciousness, including political consciousness, still regards a formation as a society comparable to a sailing ship making headway. But it's making no headway. Why not if the formation is the hull and the productive forces the sails? Because the sails of any formation are filled by the wind of civilisation.

How wonderful it is that new political thinking, which is assuming global dimensions, shows this. And how long we ignored problems of civilisation, of culture and education, as we developed the productive forces! We must admit that the residual principle current in this sphere gradually bore sour fruit.

I'm speaking of the fundamental aspect of our knowledge of society because it has a direct relation to foreign policy. The concept of peaceful coexistence is a case in point. We set great store by it but in assessing the theoretical basis of our future policy in a creative spirit, we should consider, in my opinion, how far the theory of peaceful coexistence is going to help us take our bearings in today's world. Lenin spoke of peaceful cohabitation. He never used the phrase "peaceful coexistence". The latter phrase sounds too neutral, there is no life-giving warmth in it. We put a positive interpretation on the term but, even so, it will make things somewhat difficult for us in the nineties because the West isn't very receptive to it. Some of our theorists occasionally extend the

principle of peaceful coexistence to the whole globe, making it also peaceful coexistence of capitalist countries. But while it may also be interpreted that way, we must realise that what's going on there is not peaceful coexistence: it is integrational and cooperation processes on a level no society has ever known before.

It would certainly be wrong to discard peaceful coexistence here and now because we need a measure of continuity. But my impression is that the term can't last long just the same. Its very meaning isn't clear enough. Lenin said: don't attack us, and we won't attack you. Let the American imperialists leave us alone, and we'll leave them alone, too. The situation is entirely different now.

Yelena Lukyanova, assistant professor, Chair of the State and Law, Law Faculty of Moscow University, winner of the Leninist Komsomol Prize for social science (1989): Three points without abstract considerations. What could we do? Consider the problem of human rights, which we've been studying for years and have held many dialogues and multilateral meetings to discuss. Speaking of the Americans—I was in Chautauqua—we've come to the conclusion that while we do discuss the problem with them, our lines of reasoning differ completely. We are following parallel courses. Our position on human rights until recently came down to declaring global rights, and we are only just beginning to back our declarations by creating global guarantees.

As for our negotiating partner, his attitude is entirely different. I mean guaranteeing human rights by solving various minor problems. We command a vast scientific potential and so could do the necessary research. But on what basis? Many speakers here stressed the need for research, for facilities, but we've got no funds, have we? We must proceed from what we've got today. This also goes for the association of Soviet lawyers—its youth section—which is to be granted juridical person status in December or January and will be able to operate on the basis of people's diplomacy.

It's a question of moulding public opinion both at home and abroad. Look at Chautauqua. Two lawyers spoke at the University of Pittsburgh. It so happened that one of them was a member of government (I mean Yakovlev) and the other was me. We delivered two lectures at the university on Soviet law. The following day, we received a letter saying that students had written to the Dean of the Law School to ask him to introduce a comparative course on the American and Soviet legislative systems into the university curriculum. I call that a concrete result. It would be fine if everything were coordinated. I think such courses can be introduced. The only hurdle is the mechanism of getting permission for trips abroad—it's quite a complicated business. We've signed a lot of agreements. Moscow University alone could maintain numerous scientific contacts of this kind and offer lectures on its own and hence without spending foreign exchange. All that's needed is support and requests.

My third point concerns the primacy of international law. The very first task facing us today is to bring our internal law into line with international accords because international law is nothing but coordination of the will of states unlike internal law, which constitutes a precise legislative mechanism coupled with a coercive one. We can't speak of the primacy of international law as a principle until we've brought this mechanism into line with international agreements. Currently we can only treat it as a goal we must achieve.

Vladimir Chernega, Vice-Rector, Diplomatic Academy of the USSR Ministry of Foreign Affairs: Let me begin with the need to stop banning open discussion on any scientific theme. Much has already been done to this end but many sacred cows are still there. An example to illustrate. In view of the prospect of a German reunification and the economic crisis affecting the socialist countries of Eastern Europe, the West is again discussing the idea of the "heart of Europe", and this in two versions. One of them is that a united Germany, a mighty power, would attract Poland, Czechoslovakia, Hungary and other small states. The other version is that countries like Czechoslovakia, Hungary and Austria, being apprehensive of such a Germany, would form a federation which might be joined by Poland—out of fear for its western frontier. Now while we consider that Poland would thus be prompted to move closer to us, Western analysts think the reverse might occur.

Both ideas are open to question. The important thing is that the West is discussing likely trends of development very seriously. Judging by our scientific publications, the subject is still taboo for us.

In conclusion, a very delicate point that I will risk raising just the same. This is a meeting of the Scientific Council. Let us look at our age composition because we are speaking of an intellectual breakthrough into the future, aren't we? Those below forty years of age are very few here. The latest evidence is that novel, non-standard, original ideas are conceived mostly by people below thirty in the case of the natural sciences and below forty in the case of the social sciences. Each new generation is a new scientific subculture which is objectively closer to the future than the previous generation. There is no getting away from this fact.

Raimo Pullat, Director, Institute of History, Estonian SSR Academy of Sciences: I would like to comment very briefly on the problem of archives.

First of all, I'm very glad to note that science and diplomacy have succeeded in settling the problem of returning the Estonian archives. I therefore thank the Foreign Ministry, the Embassy in Bonn and what we Estonians call the Big Academy.

Second, I wish to draw your attention to the problem of searching for evidence in archives. It seems to me that since science wants to help diplomacy, that search should also be carried on in other countries in addition to our own in the new situation, which should help us

evolve a new concept of the history of our country. Speaking of Estonia, I would say that our historians should work not only in German archives but in Britain's as well, to say nothing of Scandinavian archives.

I believe the Council would do well to discuss this matter at one of its meetings and decide on some sort of coordination. You say the Foreign Ministry is short of funds for such work. But we can say as much. And since we are both pretty poor at the moment, we've failed to carry out a certain action. You will recall that we got a letter from the Foreign Ministry asking us to send two or three scientists to the GDR and Sweden for research into problems of 1917. We selected candidates but afterwards it turned out that our Foreign Ministry had no money and that even Moscow couldn't fund the trips. I therefore ask you to give this concrete matter consideration in the future if possible.

Academician Yuri Kagan, Kurchatov Institute of Atomic Energy: The usual question that has been put to us in recent time during meetings with a wide range of "advanced" scientists, scientific advisers to presidents or prime ministers, is what they can do to help our country and its perestroika. They want a concept. The issue isn't credits on favourable terms. Our foreign colleagues may be said to want us to formulate what they could pass on in one way or another to those in authority and policymakers.

On coming back from Italy, I heard that from people in Andreotti's immediate entourage. We were marking the 25th anniversary of the famous Institute of Theoretical Physics, with Andreotti as one of the guests. I, for one, don't know the exact answer because it calls for precise political ideas which we could convey to leaders making decisions.

We have attained a very high level in theoretical physics which enables us to control the situation. But the situation in experimental physics is disastrous. The technological gap between the Soviet Union and the West is widening, not narrowing. Soviet laboratories only use foreign instruments. This means, as I see it, that the situation in the country is going to be negative in this respect because our economic problems will prevent us from allocating a large amount of money or hard currency for research. At the moment we are in a position, I think, to send gifted young candidates of science to the foremost European centres to do what would be in effect fieldwork. Why do the Chinese do so? They want their postgraduate students to be able to meet requirements immediately after completing a postgraduate course. We don't do so because we lack a concept. I think we should evolve a concept without delay while the public attitude is favourable.

Southeast Asia. We keep saying that what's going on in Southeast Asia is a miracle. We could use our research potential to make progress and create a public opinion in Southeast Asia on the basis of this potential of ours. This

is an anticipating method. We could use such opportunities until diplomacy took its bearings in the situation. What we now need in a sense is to ensure that new thinking which has arisen influences our general concept.

Alexei Kuzmin, General Designer, Vympel Central Research and Production Combine: I'm General Designer of a system of early warning against missile attack and of space monitoring. I may therefore be described as the first spokesman for the military-industrial complex at this meeting.

The interpenetration of science and diplomacy is certainly a welcome development. True, I would rather welcome penetration in one direction because I think diplomatic methods in science shouldn't be welcomed, but eradicated in every way (they are much too developed in that sphere as it is). As for movement in the other direction, it should be welcomed in the case not only of the humanities but of technology as well.

I have no formal powers to speak for the military-industrial complex and will only give you my personal views. The majority of researchers (I must say that the scientific and technological potential of the institutions of this complex is very great in this sense) and development engineers generally subscribe to the new tasks and new thinking in the sphere of both defence and military policy that were discussed here. I know that there are many who disagree but I think they are wrong. We hail the aims—long-term aims—concerning a non-violent world that would also be nuclear-free, as a first step. We are well aware that it isn't enough to launch this slogan because we also need a phased policy charting the path of our advance to that world. The sector I represent is active in this respect and has put forward a package proposal on how we should advance. The package includes a proposal for organising, at once or gradually, international space monitoring and early warning systems as a step in that direction. There are quite a few other proposals. We've made them on our own initiative, not on instructions from anybody. This is typical enough of our sector.

Many speakers here pointed out the importance of contacts between the Foreign Ministry and science, associating science with the Academy of Sciences only. But science is also the concern of other departmental institutions. True, it would be hard for the Scientific Council or the Foreign Ministry's Scientific Coordination Centre to maintain contact with all these institutions because they are too many. It should therefore keep in touch with the agency supervising the scientific industrial and scientific and technological institutions active in this sphere. I mean the military industrial commission. I think more extensive ties can be established through the commission and its scientific and technological council with very many scientific institutions and even with individual scientists working there.

This forum was used for attempting a serious discussion of some problems but the five- or six-minute time limit

only makes it possible to touch on them. There are technological, scientific, social, humanitarian and other problems among them. Evidently, they can't be discussed seriously before so serious an audience. I therefore suggest forming a number of sections within the Scientific Council to seriously study various problems and report the results to full meetings of the Council. I think this would make it possible to discuss problems more seriously.

Overall, I consider such contacts fruitful. More importantly, they are fruitful in terms of both conceiving new ideas and solving practical problems in the near and distant future.

Vladimir Zinchenko, Director, Institute of Man: I'm a member of a very small and strange tribe. One day Radio Moscow announced me, a psychologist, and men who catch snakes as "rare birds". Indeed, my profession is almost extinct, and this is in keeping with the awful state of our education and culture.

But the ice is beginning to shift, if slowly. We have launched two programmes this year. One of them is a Japanese programme concerning the limits of man's possibilities. It is an international programme for which the Japanese have put up 150 million dollars. The other programme, a Soviet one, is on, too. It is called "Man, Science, Society". The Academy of Sciences has allocated five million dollars, to be spent on both man and science.

We are beginning to grow weary from talk about things spiritual. Isn't it time we stopped? When are we going to begin doing something about those problems? What makes the situation paradoxical is that we have an invaluable treasury of what is a great national moral philosophy. We've now begun to restore some of it. Why, we had buried a whole civilisation. Things came to a pass where an American psychologist delivered a lecture on voices of reason in Utrecht and where the "voices" turned out to be those of two Soviet scholars, Mikhail Bakhtin and Lev Vygotsky. Dozens of conferences are held to discuss the theory evolved by Bakhtin and Vygotsky but very few Soviet scholars get a chance to attend them.

We, that is, professionals, non-professionals and our government departments, make poor use of existing contacts with colleagues abroad, including Japan and the United States. I recall Lefevre, who has been living in California for 15 years and serves on a select psychological team. He has published two excellent books since he arrived there: "The Algebra of Conflict" and "The Algebra of Conscience". He examines two moral systems. One of them was ours, a system under which the end justified the means. The other was the Western system, under which the end didn't justify the means. Our system sought confrontation while the other system strove for compromise. Lefevre gives an example: when

Carter kissed Brezhnev in Vienna, we took that for a sign of weakness on Carter's part whereas it was merely an indication of tact.

A final point. Soviet people are tired of decisions. Let us realise at long last that there is a big difference between making decisions and solving problems. We are all tuned in to making decisions, now as in the past, and still imagine that once we've made a decision everything will be all right. With us, making a decision creates the illusion of action and as for solving a problem, we let it drift. Our diplomats, however, realise that better knowledge is a requisite for solving problems. Better knowledge is a great thing, and therefore some progress in this sense is much more important than dozens of decisions.

Marina Lebedeva, Cand. Sc. (Psychol.), senior researcher, Problem Laboratory, Moscow State Institute of International Relations: We need an interdisciplinary science. What we should study chiefly is not only history, economics and law in international relations (although we also need this kind of research) but processes, phenomena, and so on, taking place in international relations. I mean conflicts, talks, various diplomatic activities. Not all of this can be examined within the framework of one science or of three (meaning the sort of triumvirate that history, economics and law formed in

the past). It requires a really interdisciplinary approach enlisting the assistance of the most diverse sciences, including philosophy, psychology, sociology, linguistics and hermeneutics. What is needed, however, is an integration of these sciences, not their totality. This is the road taken by world science.

Our science has rather rigid and unwieldy structures. It would be naive to expect to change things with one stroke but we must bring about changes, at least gradually. We could begin by introducing interdisciplinary sections into existing periodicals. The Americans publish periodicals devoted to conflict solving, negotiating and other matters. I know that it's hard to start a new periodical but I suppose adding a new section to existing periodicals is no problem. We need at least interdisciplinary groups in existing research institutions to deal with specific themes, such as, say, talks in today's Europe: their pattern, mechanisms, typology, prospects. In drafting foreign policy decisions, the Ministry could have such centres examine its draft, preferably on an alternative basis. For instance, a Ministry directorate about to propose a decision might want to know how valid it is from the scientific point of view or what positive and negative results its implementation is likely to produce. In turn, scientific institutions and organisations could benefit from a kind of examination by diplomats.

Meeting of the Scientific Council of the USSR Ministry of Foreign Affairs

November 24, 1989

List of Participants

A. Arbatov	Head of Department, USSR AS Institute of World Economy and International Relations
S. Averintsev	Corresponding Member, USSR AS; Gorky Institute of World Literature, USSR AS
V. Avduyevsky	Academician, Chairman, USSR AS Commission for Conversion; Blagonravov Institute of Mechanical Engineering, USSR AS
E. Babayan	Chairman, Standing Committee on Narcotics Control under the USSR Ministry of Public Health, and Representative of the USSR to the ECOSOC Commission on Narcotic Drugs
V. Balebanov	Deputy Director, USSR AS Institute of Space Exploration
Yu. Bandura	Deputy Editor-in-Chief, MOSCOW NEWS
A. Bekarevich	Deputy Director, USSR AS Institute of Latin America
V. Burakovsky	Director, Bakulev Institute of Cardiovascular Surgery, USSR Academy of Medical Sciences
G. Chufrin	Deputy Director, USSR AS Institute of Oriental Studies
Ye. Fedosov	Academician, Director, Institute of the USSR Ministry of the Aircraft Industry
K. Frolov	Academician, Vice-President, USSR AS; People's Deputy of the USSR
I. Golembiovsky	Deputy Editor-in-Chief, IZVESTIA
An. Gromyko	Corresponding Member of the USSR AS and Director of the Academy's Institute of Africa
B. Grushin	Deputy Director, National Centre for Public Opinion Studies under the AUCCTU and USSR State Committee on Labour and Wages
V. Kabanov	Academician, Presidium member, USSR AS; Moscow State University
Yu. Kagan	Academician, Kurchatov Institute of Atomic Energy
A. Kislov	Director, Institute of Peace
A. Kokoshin	Corresponding Member of the USSR AS and Deputy Director of the Academy's Institute of the USA and Canada
S. Korovkin	Chairman, Energy Central Research and Production Combine
A. Kuzmin	General Designer, Vypel Central Research and Production Combine

Meeting of the Scientific Council of the USSR Ministry of Foreign Affairs (Continued)

November 24, 1989

List of Participants

M. Lebedeva	Senior researcher, Problem Research Laboratory, Moscow State Institute of International Relations, USSR Ministry of Foreign Affairs
Ye. Lukyanova	Assistant professor, Chair of the State and Law, MSU Faculty of Law; winner of the Leninist Komsomol Prize for social science (1989)
I. Makarov	Academician, Chief Scientific Secretary, Presidium of the USSR AS
G. Marchuk	Academician, President, USSR AS
V. Martynov	Corresponding Member of the USSR AS and Director of the Academy's Institute of World Economy and International Relations
V. Matrosov	Academician, Director, Irkutsk Computer Centre, Siberian Section of the USSR AS
A. Meliksetov	Director, Institute of Asian and African Countries under the Moscow State University
A. Meshchersky	Deputy Editor-in-Chief ARGUMENTY I FAKTY
N. Motrashilova	Head of sector, USSR AS Institute of Philosophy
M. Narinsky	Deputy Director, USSR AS Institute of World History
Yu. Osipyan	Academician, Vice-President of the USSR AS and Director of the Academy's Institute of Solid-State Physics; People's Deputy of the USSR
E. Pozdnyakov	Chief researcher, USSR AS Institute of World Economy and International Relations
R. Pullat	Director, Estonian SSR AS Institute of History
A. Ryazanov	Researcher, USSR AS Institute of Protein, winner of the Leninist Komsomol Prize
Yu. Ryzhov	Academician, Chairman, USSR Supreme Soviet Committee on Public Education, Culture and Upbringing
Yu. Sayamov	Deputy Chairman, Committee of Soviet Scientists for Peace, Against the Nuclear Threat
N. Setunsky	Editor-in-Chief, EKHO PLANETY
V. Shastitko	Deputy Director, USSR AS Institute of the Economy of the World Socialist System
S. Shatalin	Academician, USSR AS Institute of Economy and Scientific and Technological Progress Forecasts; scientific consultant, Scientific Coordination Centre, USSR MFA
A. Shlepakov	Academician, Director, Ukrainian SSR AS Institute of Social and Economic Problems of Foreign Countries
G. Sidorova	Political commentator, NEW TIMES
A. Spirin	Academician, member of the USSR AS Presidium and Director of the Academy's Institute of Protein
V. Styepin	Corresponding Member of the USSR AS and Director of the Academy's Institute of Philosophy
B. Topornin	Corresponding Member of the USSR AS and Director of the Academy's Institute of the State and Law
G. Vasilyev	Political commentator, PRAVDA
Ye. Velikhov	Vice-President of the USSR AS and Academic Secretary of the Academy's Section of Information Technology, Computer Engineering and Automation; People's Deputy of the USSR
V. Volkov	Director, USSR AS Institute of Slavonic and Balkan Studies
A. Yablokov	Corresponding Member of the USSR AS and Director of the Academy's Koltsov Institute of Development Biology; People's Deputy of the USSR
V. Yadov	Director, USSR AS Institute of Sociology
A. Yakovlev	Head of sector, USSR AS Institute of State and Law; People's Deputy of the USSR
V. Zhurkin	Corresponding Member of the USSR AS, Acting Academic Secretary of the Academy's Section of Problems of World Economy and International Relations, and Director of the Academy's Institute of Europe
V. Zinchenko	Director, Institute of Man
A. Bessmertnykh	First Deputy Minister
Yu. Vorontsov	First Deputy Minister
A. Kovalyov	First Deputy Minister
E. Obminsky	Deputy Minister
V. Petrovsky	Deputy Minister
V. Karpov	Deputy Minister

Meeting of the Scientific Council of the USSR Ministry of Foreign Affairs (Continued)

November 24, 1989

List of Participants

V. Dolgov	Secretary of the Party Committee, USSR MFA
A. Kozyrev	Chief, Directorate of International Relations, USSR MFA
B. Mayorsky	Chief, Directorate of International Scientific and Technological Cooperation, USSR MFA
R. Ovinnikov	Rector, Moscow State Institute of International Relations, USSR MFA
R. Otunbayeva	Chairman, USSR Commission for UNESCO
O. Peresypkin	Rector, Diplomatic Academy, USSR MFA
B. Pyadyshev	Editor-in-Chief, INTERNATIONAL AFFAIRS
A. Stepanov	First Deputy Chief, Main Department of Personnel and Educational Establishments, USSR MFA
I. Sysoyev	Vice-Rector, Moscow State Institute of International Relations, USSR MFA
S. Tarasenko	Chief, Evaluations and Planning Directorate, USSR MFA
A. Torkunov	Vice-Rector, Moscow State Institute of International Relations, USSR MFA
V. Chernega	Vice-Rector, Diplomatic Academy, USSR MFA
V. Churkin	Adviser to the Minister
V. Shustov	Leader, Scientific Coordination Centre, USSR MFA

Vacancies in Ukrainian Academy of Sciences
907A0159A Kiev PRAVDA UKRAINY in Russian
4 Feb 90 p 4

[Article: "From the Ukrainian SSR Academy of Sciences"]

[Text] The Ukrainian SSR Academy of Sciences, in conformity with Sections 19 and 20 of its charter, announces the available vacancies of full members (academicians) of the Ukrainian SSR Academy of Sciences and corresponding members of the Ukrainian SSR Academy of Sciences in the following specialties:

	Academicians	Corresponding Members
Mathematics Department		
Mathematics	1	1
Mathematical Problems of Mechanics	—	1
Information Science, Computer Technology, and Automation Department		
Computer and Information Technology	—	1
Information Science	—	1
Mathematical Cybernetics	—	1
Mechanics Department		
Mechanics	1	2
Dynamics and Strength of Machines	—	1
Mining Mechanics	1	—
Physics and Astronomy Department		
Theoretical Physics	1	—
Experimental Physics	1	—
Radiophysics, Radio Astronomy	1	—
Experimental Nuclear Physics	—	1
Semiconductor Physics	—	1
Surface Physics, Electronics	—	1
Astrophysics, Astronomy	—	1
Solid-State Physics	—	1
Earth Sciences Department		
Geophysics	1	1
Geology	1	1
Petrology, Ore Deposits	—	1

Lithology, Geology of Combustible Minerals	—	1
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Physical and Technical Problems of Materials Science Department

Metallurgy of Steel and Ferroalloys	1	2
Materials Science, Powder Metallurgy	1	1
Materials Science, Strength of Materials	1	2
Materials Science, Welding of Metals	—	1
Scientific Instrument Making	—	1
Materials Sciences, Strength Physics	—	1

Physical and Technical Problems of Power Engineering Department

Power Engineering	1	—
Electric Power Engineering	—	1
Thermal Power Engineering	—	1
General Power Engineering	—	1

Chemistry and Chemical Technology Department

Physical Chemistry	—	2
Inorganic Chemistry	—	1
Organic Chemistry	—	1
Chemistry of High Molecular Compounds	—	1
Chemistry and Technology of Water Purification	—	1

Biochemistry, Physiology, and Theoretical Medicine Department

Biophysics	1	—
Experimental Oncology	1	—
Molecular Genetics	—	1
Biochemistry	—	2
Microbiology	—	1
Physiology, Medicine	—	1

General Biology Department

Radiobiology	1	—
Geobotany	1	—
Genetics and Selection	1	—
Invertebrate Zoology	—	2
Cell Biology	—	1

Economics Department		
Economics of the Agroindustrial Complex	1	—
Economics	—	1
Regional Economics	—	1
International Management	—	1
Economics of Industry	—	1
History, Philosophy, and Law Department		
Archeology	1	—
Philosophy	—	1
Labor Sociology	—	1
Theory of Nations and National Relations	—	1
History of Culture	—	1
Literature, Language, and Art Department		
Literary Criticism	1	1
Linguistics	—	1
Art Criticism	—	1

In conformity with Section 14 of the charter of the Ukrainian SSR Academy of Sciences, scientists, who have enriched science with works of foremost scientific importance, are elected full members (academicians) of the Ukrainian SSR Academy of Sciences.

In conformity with Section 15 of the charter of the Ukrainian SSR Academy of Sciences, scientists, who have enriched science with outstanding scientific works, are elected corresponding members of the Ukrainian SSR Academy of Sciences.

The councils of scientific institutions and higher educational institutions, state and public organizations, full members and corresponding members of academies of sciences are granted the right within 1 month from the day of publication to report in writing to the Ukrainian SSR Academy of Sciences with the appropriate explanation the names of candidates for full members and corresponding members of the Ukrainian SSR Academy of Sciences in the specialties indicated in this publication (Section 21 of the charter).

The nomination of candidates by scientific institutions, higher educational institutions, and state and public organizations is conducted at meetings of the scientific and scientific and technical councils, collegiums, or presidiums by secret ballot by a simple majority of votes.

In reporting the names of candidates for full members and corresponding members of the Ukrainian SSR Academy of Sciences, it is necessary to attach the following documents (in two copies): the representation (decision) of the council and state and public organizations or a letter with the appropriate explanation in case

of the nomination of a candidate by full members and corresponding members of academies of sciences, an autobiography, a personal personnel registration form with a photograph measuring 4.5 by 6 centimeters, a description of the production and social activity of the candidate from the basic place of work, a copy of the VUZ [higher educational institution] graduation diploma, copies of certificates on the conferring of an academic degree and title, a list of scientific works (form 2.3), and reviews on their importance.

In case of the failure to submit any of the above-mentioned documents the candidate cannot be registered.

All the materials are to be sent to the address: 252601, Kiev-GSP, Ulitsa Vladimirskaia, 54, the Ukrainian SSR Academy of Sciences.

[Signed] The Presidium of the Ukrainian SSR Academy of Sciences

Uzbek Central Committee Examines S&T Cadre Problem

907A0168A Tashkent PRAVDA VOSTOKA in Russian
27 Feb 90 p 1

[Article: "In the Central Committee of the Communist Party of Uzbekistan"]

[Text] The Secretariat of the Central Committee of the Communist Party of Uzbekistan considered the question "On the Expansion of the Training of Scientific Personnel for the Republic." In the adopted decree it is noted that in recent years in the Uzbek SSR, proper attention was not devoted to the training of scientific personnel, particularly of the highest skill—doctors of sciences. In this work there are no system and planning basis, it is being performed without proper coordination with the needs and the prospects of development of the national economy, the forming trends are not being analyzed, and proper steps on straightening out the state of affairs are not being taken. As a result of this an acute shortage of highly skilled specialists is being felt in a large number of directions of science, which are priority ones for the republic. The share of doctors of sciences at higher educational institutions comes to 2.6 percent (418 people), while in the system of the Uzbek SSR Academy of Sciences it comes to 7.3 percent (317 people). At scientific institutions of the Academy of Sciences of the 458 positions, which are to be filled by doctors of sciences, doctors work in only 217, while at higher educational institutions of the Uzbek SSR Ministry of Public Education and the Uzbek SSR Ministry of Higher and Secondary Specialized Education of the 993 heads of characteristic chairs only 206, or 22 percent, are doctors of sciences.

As a result of the lack of attention to this important question on the part of the republic Council of Ministers

and State Planning Committee, the Academy of Sciences, and ministries, which manage educational institutions, a mechanism of the selection and training of scientific personnel has not been established, a formal approach prevails here. As an example it is indicated that the leadership of the academy is tolerating the fact that only 16-17 places in doctoral studies are annually allotted to its institutes, moreover, in accordance with a fixed list of specialties that were specified long ago and mechanically. The training of doctors of sciences in such specialties, which are of decisive importance for the intensification of social production, as the mechanization of agricultural production, robots and manipulators, computer algorithms and software, and others was not even envisaged in the plans for the current five-year plan.

The Council of Ministers, the State Planning Committee, the Academy of Sciences, and the Ministry of Higher and Secondary Specialized Education are not displaying anxiety in connection with the fact that the number of doctoral students from Uzbekistan, who are studying at leading scientific centers of the country, has decreased substantially and groundlessly few places when sending scientific personnel abroad for practical studies are being allocated by union organs for the republic.

All this, it is noted in the decree, has led to the substantial reduction of the influx of fresh young forces into science and the slowing of the process of the replacement of scientific personnel, the tendency for the scientific potential to grow older has emerged. For the system of the Uzbek SSR Academy of Sciences the average age of doctors of sciences has reached 60, at its institutes there is not one doctor of sciences under 35 and only five under 40. As a whole for the republic doctors of sciences up to the age of 50 make up only 14 percent of their total number.

The same trend is also observed among candidates of sciences, whose average age is 46.

In the decision it was stressed that the problems of the training of scientific personnel have acquired political importance, for the pace of the socioeconomic development of Uzbekistan depends in many respects on their solution. The existing practice is not capable of ensuring a breakthrough in the saturation of the national economy of the republic with highly skilled personnel and of eliminating the lag in the pace of scientific and technical progress. Immediate steps on the correction of the formed situation and fundamental changes in the system of the training of scientific personnel, particularly of the highest skill, are needed.

It was taken into consideration that on the instructions of the Central Committee of the Communist Party of Uzbekistan the Uzbek SSR Council of Ministers and State Planning Committee and the appropriate ministries and departments of the republic jointly with the USSR State Committee for Science and Technology and

other union organs had settled the questions connected with the unplanned, additional sending in 1990 of about 100 young scientists for training in doctoral studies at leading scientific research institutes of the country—the institutes of machine building, earth physics, history of the USSR, and state and law of the USSR Academy of Sciences, Moscow State University, Leningrad State University, the Moscow Higher Technical School imeni Bauman, the institutes of nutrition, eye diseases, and epidemiology and microbiology of the Academy of Medical Sciences, the All-Union Breeding and Genetics Institute, the All-Union Scientific Research Institute of Plant Growing, and the All-Union Institute of Experimental Veterinary Medicine.

In the adopted decree the work of the Uzbek SSR Council of Ministers, the State Planning Committee, the Presidium of the Academy of Sciences, the Central Asian Department of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin, the Ministry of Higher and Secondary Specialized Education, the Ministry of Public Education, and the Ministry of Health on the training of scientific personnel for the republic was declared unsatisfactory. It was noted that as a result of serious shortcomings in the work of these organizations in Uzbekistan a mechanism of the identification, selection, and utmost support of talented young people has not been established and many most important directions of science do not have adequate manpower supply. As was indicated in the decision, the corresponding departments of the Central Committee of the Communist Party of Uzbekistan did not ensure the proper level of party supervision of this section and the formation of an integral system of the increase of the scientific personnel potential of the republic.

The Council of Ministers, the State Planning Committee, the Academy of Sciences, the Ministry of Higher and Secondary Specialized Education, the Ministry of Public Education, the Ministry of Health, and other ministries and departments of the Uzbek SSR were charged to outline and implement specific steps on the formation of scientific personnel, which are linked fundamentally with the needs and prospects of the economic, social, and spiritual development of Uzbekistan.

It was deemed necessary to use henceforth in practice the systematic annual sending of doctoral students, graduate students, and practical students from among the talented young people of the republic to leading scientific centers of the country and foreign states.

For these purposes the Presidium of the Academy of Sciences (Comrade M.S. Salakhitdinov), the republic Ministry of Higher and Secondary Specialized Education (Comrade Sh.A. Alimov) and other ministries and departments, which have scientific research institutions and higher educational institutions, and the Ministry of Foreign Affairs (Comrade S.A. Azimov) were charged to ensure the conclusion of direct contracts with foreign scientific and educational centers on the training of personnel and the practical studies of specialists in

accordance with the experience of Tashkent State University imeni V.I. Lenin. The opportunities, which are afforded by the agreement on the development of economic, scientific and technical, and cultural cooperation between the Uzbek SSR, Leningrad, and Leningrad Oblast, should also be used extensively.

It was particularly noted that it is necessary to carry out the selection of candidates, who are sent for training in doctoral studies, graduate studies, and practical studies, on a competitive basis, in a democratic atmosphere, and under the conditions of extensive publicity.

The Uzbek SSR Council of Ministers and State Planning Committee were ordered to find assets for the implementation of the measures, which are connected with the expansion of the training of doctors of sciences and the sending of young scientists to the center, and to consider and settle the necessary organizational questions, including the question of providing doctoral students with housing at the place of study.

For the assurance of continuity in science and the efficiency of the use of the existing potential the Academy of Sciences and the Ministry of Higher and Secondary Specialized Education were charged to implement a set of steps on the utmost enlistment of leading scientists of the academy in the combination of basic work with teaching work at educational institutions.

It was deemed necessary to form under the Uzbek SSR Council of Ministers a commission for the coordination of work on the training of scientific, engineering and technical, and management personnel, having given it the necessary directive and executive functions, and to establish structural subdivisions of the commission in the Uzbek SSR Academy of Sciences, the corresponding ministries and departments, the Karakalpak ASSR Council of Ministers, and the executive committees of oblast soviets of people's deputies.

The formulation of a national program of the training of personnel and the organization of work on its implementation and the development of a mechanism of the identification, selection, and training of highly skilled personnel, starting with the general educational school, were specified as the main task of the commission.

Moreover, it is proposed to assign to the commission the questions of the formation and use of the specialized Fund imeni Ulugbek, the assets of which will be allocated for the support of talented young people and the organization of their training, including abroad.

Party and soviet organs, the mass media, and the Vatan Society were charged to promote extensively among the population of the republic and the country and in foreign states the goal and tasks of the Ulugbek Fund and to stimulate the enlistment in its formation of labor collectives and individual citizens, including from abroad.

For the purposes of the training of educators, who are specialized in work with gifted children, and the development and practical testing of scientific methods principles of the identification, selection, and training of talented people in Uzbekistan it was deemed expedient to establish at Tashkent University an educational scientific pedagogical complex, which includes an educational psychology faculty-scientific laboratory-lyceum, and to transfer for this to the jurisdiction of Tashkent State University the Republic Boarding School of Young Physicists and Mathematicians. The corresponding assignments were given to the Council of Ministers, the Ministry of Higher and Secondary Specialized Education, and Tashkent State University.

In the adopted decree it was noted that matters in the area of the agricultural sciences are especially unfavorable, and steps on the straightening out of the state of affairs, which has formed at the Central Asian Department of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin, were outlined.

Scientists Comment on Compensation, Contract Issues

907A0173A Moscow NTR TRIBUNA in Russian
No 3-4, 23 Feb 90 p 12

[Article by V. Dvoretzkiy under the rubric "We Continue the Theme": "Compensation for Underpayment"; first two paragraphs are NTR TRIBUNA introduction]

[Text] The practice of using cost accounting has created a large set of problems. The significant increase of the wage at applied scientific research institutes and design bureaus did not cause as significant an acceleration of scientific and technical progress. The conversation of our correspondent with Doctor of Economic Sciences V. Felzenbaum, lead scientific associate of the Institute of Economics of the USSR Academy of Sciences (NTR, No 22, 1989, "Easy Money"), was about this and a number of other problems.

Many responses to this publication were received. Both by the editorial board and by the Institute of Economics. The most interesting proposals and ideas, which make it possible to analyze the problem more thoroughly and to approach its solution, were chosen for the survey.

Ye. Pokrovskiy, a candidate technical sciences from Moscow, believes that an arbitrarily established standard of the remuneration of labor in the amount of work and a rigid schedule of salaries in essence paralyze the creative initiative of researchers and developers. This leads to the aspiration to obtain a few more orders given the established quality of research. The inadequate deductions for the development fund of institutes, and particularly the lack of foreign currency assets, do not enable researchers even to approach foreign specialists in the level of the capital-labor ratio, therefore, at times they have to design and produce instruments themselves, often reinventing in so doing the bicycle.

And there is another thought from the letter of Ye. Pokrovskiy, which one must not pass over. It is a question of the ethics of relations and of the problem of morality in science. He writes that often the participation of a scientific administrator is confined just to the work of applying a pen for a signature and appropriating the results of works that actually belong to others. How this contrasts with the situation in American science, where "decency as an indispensable attribute of scientific professionalism is formed by the very system of the organization of...science," as M. Ivanov notes on the page of NTR, which is adjacent to the report "Easy Money."

Thus, the present system of cost accounting is giving rise not so much to "easy" money as to money thrown to the wind. The inequality of the payments (and expenditures in general) to the results of the work of many institutes is the subject of the reflections of many authors.

I. Yuganson, senior scientific associate of the All-Union Scientific Research Institute of Problems of Scientific

and Technical Progress and Information in Construction of the USSR State Construction Committee, reflects that the present situation was created not simply by the introduction of cost accounting in science, but under the active pressure of old problems as well. The burden of the past, he writes, "is the formed structures of the organization of applied scientific research, which are oriented toward individual sectors and subsectors of the national economy, and their corresponding monopolization, the aspiration of ministries and departments retain at any price subordinate, even inefficient scientific organizations, by giving them financial support, and the limited opportunities of enterprises in the realization of the assets of development funds, as a result of which they are willing to pay considerable sums in order to obtain what is necessary.

"It would be possible to reflect about why ministries need unprofitable and absolutely unproductive scientific research institutes and who 'has from this' what. But, I believe that the discussion with readers on cost accounting in science will not be concluded on the pages of NTR by this publication, and I would like to find out in this regard the opinion of a competent person."

The problem of the establishment of contract prices is extremely complicated and urgent when introducing cost accounting in science. Here is the suggestion of I. Yuganson.

Procedural instructions, which make it possible to specify an economically sound range of the contract price from the minimum level, which characterizes the limit of expedience for the developer, to the maximum level, which establishes the corresponding limit for the client (buyer) of a job, are necessary.

The question of the right of ownership of a scientific and technical development in the area of the duplication of its results with allowance made for who financed its performance should also be settled. This would make it possible to regulate the resale of jobs or, in any case, to establish a procedure of the redistribution of the revenues from them. In addition to this within the framework of the existing approach to the improvement of the economic mechanism it is possible to examine the question of the introduction of a tax on the repeated sale of a scientific and technical product which was developed once.

Ya. Torchinskiy, head of a laboratory of the UkrNIIInzhproyekt from Kiev, does not consider wages to be "easy," but believes that "the present add-on is a kind of compensation for many years of chronic underpayment."

Ya. Torchinskiy takes a negative view of the ideas contained in "Easy Money." Therefore, I will cite his reflections and suggestions without comments.

"For the most part contract prices are being fired at—they, supposedly, are set too high," he writes. "Here—deliberately or not—a serious theoretical mistake is

being made. The point is that the contract price by its nature cannot be either set too high or set too low, but can be only as it is. It is formed in the process of buying and selling and emerges at the moment when the partners shake hands on it. Because contract prices reflect the level which is advantageous for both parties. If they did not find it, a deal is not made, the contract price does not appear."

What is to be done? Ya. Torchinskiy believes that it is best of all to devise a correct alternative model of the determination of contract prices. Two versions are proposed.

"It is possible to determine contract prices on the basis of expert evaluations. But a skilled examination is expensive and is not carried out quickly. Moreover, if the institute does not agree with the expert price, it will not undertake the job. The client will be left with the money, but without the product he needs. And who will gain in this case?

"The second version. It is possible to invite two, five, or more scientific research institutes or other organizations to perform this job. Each potential developer will submit his opinions, the anticipated technical and economic indicators of the ordered product, and the cost of its completion. The buyer will choose the version most acceptable for him.

"The latter method is more perfect. But by such an auction the contract price once again is also established, only by means of not a two-person, but a many-person game.

"And another one is not given."

Yu. Bazhal, head of the department of economic problems of scientific and technical progress of the Institute of Economics of the Ukrainian SSR Academy of Sciences, analyzes the factors which govern the situation, which the client of a scientific and technical product does not act against fictitious payments.

In the present system of the management of scientific and technical progress an effective institution of "the client" of the scientific and technical product is absent. This institution is nearly identical to the institution of "the performer," and, hence, the majority of existing scientific and technical organizational forms prove to be closed systems, which, in conformity with the laws of nature, should develop according to the script of degradation.

Exclusiveness makes these organizational forms in the financial respect either a burden for the budget, since other clients are not found, or a mechanism of the inflationary pumping of money from economic circulation in the case with sectorial science, when the closed "ministry—scientific research institute" system makes scientific and technical activity uncontrolled.

The problem of the lack of an outside client is striking a very hard blow to basic science, which is now being

supported exclusively by the decency and enthusiasm of individual scientists and is not backed by an effective organizational form.

Yu. Bazhal also considers it necessary to formulate the principles of the establishment of a network of organizations which are the clients of the scientific product, particularly for basic and vanguard scientific developments. These should be independent institutes of examination with a floating structure of subdivisions and a large number of enlisted expert-specialists, who would formulate the scientific and technical program and act as the managers of state funds of scientific and technical progress.

And another idea of Yu. Bazhal seems interesting.

He writes that a procedure of the implementation of the requirement of the competitive selection of performers has absolutely not been developed. The procedure of the distribution of orders and resources is now a powerful tool of power of the bureaucracy, which is concealed by a veil of secrecy. It is interesting that the development of scientific and technical cooperations has led to the formation of new newspapers and rubrics in journals, where these collectives offer their services, but there are practically no announcements of clients on the existence of a need for services and announcements of a competition among performers.

It would be advisable, Yu. Bazhal suggests, to establish a newspaper, in which announcements of the competition of performers for themes, which are financed from various sources, would be published regularly. This would make it possible to improve the awareness of scientific and technical circles about the market of orders, would weaken the mechanism of the monopoly of head organizations, and would place under the control of the public the procedure of distributing assets for scientific research and development.

The idea seems very fruitful to the editorial board of NTR, and in the near future we will try to implement it.

Goals of Zelenograd 'Technopolis' Described

907A0172A Moscow OGONEK in Russian No 10, Mar 90 pp 7-8

[Article by Yuriy Govorukhin under the rubric "Perestroyka: The Test by Deed": "The Technopolis in Zelenograd—Do Not Miss the Chance"]

[Text] But what if we were to "overtake and surpass America" in electronics? Do not be in a hurry with an ironic smile: The approach is serious. Zelenograd, where enterprises of the Ministry of the Electronics Industry have been concentrated since the 1950's, is throwing down the gauntlet. Here they also conceived the idea to establish a technopolis—a city which specializes in scientific and technical and planning and design activity. The experience of the famous Silicon Valley, which gave

America leadership in progress, was studied. The Japanese program was also taken into account, in accordance with it 19 cities of science-intensive production are being built. We for the present want to establish one, but our own; a real technopolis—the habitat of the new man, a “cosmos” of ideas, a sphere of free economic relations, which are absolutely unlike what we have now. To create a world, which is unknown and alien to us, which we are rejecting out of ideological considerations, but in which we want to live!

Jump Onto the Departing Train

Oh, how these lads are hurrying, how they are making haste! It is extremely desirable, it is needed very much, it is absolutely necessary that the USSR Council of Ministers would adopt a decree on the establishment in Zelenograd of a technopolis—a city of high technologies of microelectronics. This is connected both with the elections to the local soviets of people's deputies and with the subsequent inevitable shakeup of the apparatus. The Initiativa Fund, which united a number of Zelenograd enterprises, with the participation of the city soviet and the rayon party committee formulated a program and got things arranged for it in the State Committee for Science and Technology, the USSR Academy of Sciences, and the Ministry of the Electronics Industry. Now the signature of its own ministry on the basic document is required, then a decree should be adopted. It is necessary, necessary to settle this question as soon as possible....

Speed is also needed because the train is departing. Our lag in electronics is catastrophic: in large computers, in personal computers, and in microcircuits. The gap is increasing. In our country introduction is dragged out for years, even decades, “there” it is a matter of months and weeks. “They,” figuratively speaking, are making a display, while we for the present are making a crystal receiver. It is uncomfortable even to speak about the quantitative aspect: they bake significantly more than half of the world electronic “pie” in the United States and Japan, we are content with a pitiful piece.

But it is not necessary, I believe, to take a long time to explain what electronics is in the modern world. Even if we were to remain lying on the stove, as that Emelya, it itself, our dear little stove, will be able to run sufficiently fast after the “shuttles,” “Fords,” “Volvos,” “Toyotas,” and “Chevrolets” only if it is stuffed with electronics. Here it is even not a question of prestige—it is necessary to survive. Incidentally, we are not such bast-shoe people, precisely our country was the pioneer in the idea of technopolises. This is not only the Novosibirsk Academic Campus or Zelenograd. In the 1950's and 1960's several tens of towns of scientific and technical specialization were established in the Moscow suburbs. Our radio engineering, aviation, and space industries originated in them. Only here is the trouble: the administrative system hid these technopolises in “boxes”; there was no competition, no exchange of information, there were

complete military secrets, complacency, and the conviction that in our socialist system and, perhaps, in the entire world we are the very first that there is.... In reality the country, having shut itself off, “saved” an extremely low quality of products and their complete inability to compete. Economic sluggishness and economic incompetence vigilantly protected us from progress. At the same time abroad they were able after us to establish technopolises as something whole, living, and dynamically developing. The electronic cities there quickly embodied an idea in “iron,” formed a worker, who was prepared for the acceptance of new knowledge and abilities, and, what is no less important, achieved a high standard of living, while this ensured an influx of first-class specialists.

And now these lads want to overtake America. Are they castle builders? Why, no—it is our great and quite realistic hope. “In the present economic situation,” explains Aleksandr Chuyenko, director of the Zelenograd Center of the Scientific and Technical Creativity of Youth, “we cannot count on financial assistance. Nevertheless here they ask: ‘But how much will this electronics industry of “yours” cost?’ We say: ‘Nothing additional is needed for the technopolis in Zelenograd, except the assets that were allocated earlier. But in order to obtain a return, we need economic freedom.’”

Administrators, functionaries, workers, and peasants want to obtain freedom, while the intelligentsia—it simply went crazy over it. Although no one clearly knows how to give it and what it, freedom, is. The USSR Supreme Soviet and the government are racking their brains over laws on land and property, the press, taxation, joint-stock companies, and the banking system. Freedom for everyone tomorrow, by ukase, and so that first thing in the morning everyone would be completely free.

“Why, no,” the people with whom I am speaking note. “The freedom, about which we are speaking, is not introduced by decrees, but is gained under specific economic conditions. At first if only free enterprise zones should be established. An environment for changes. And let Zelenograd become such a zone. We will sell not human labor, even not ideas, although this is more prestigious than trading in timber and gas, but competitive electronic products.”

The Microcircuit of a New Life

But how is one to do everything in order to actually “overtake and surpass”? Let us acquaint ourselves a little more closely with the people with whom I am speaking: Aleksandr Chuyenko, director of the Doka Center of the Scientific and Technical Creativity of Youth; Aleksey Gritsay, his deputy; Viktor Mironenko, executive director of the Initiativa Fund; Yuriy Ilin, first secretary of the Zelenogradskiy Rayon Party Committee. Each of them is under 36 years old, they all graduated from the Moscow Institute of Electronic Engineering. They are taking different routes, but the Doka Center of the

Scientific and Technical Creativity of Youth was one of the first to beat its own path in the organization of science-intensive production, which is capable of discerning new ideas and embodying them in "iron." The name is an obliging one, "doka" [expert, authority] is a person, who is particularly well-versed in something, a expert of his job. Now there are more than 30 of them, the lucid minds, but in May 1987 they began with a smaller number—without credit, literally from scratch. For the first 4 months the enthusiasts did not receive a wage at all. However, by the end of the same year the volume of work reached 721,000 rubles, then passed 5 million rubles, while last year it exceeded 8 million rubles. The firm has its own character and its own market. What do they do? They seek and find technological solutions, and not only in microelectronics, but also bioengineering and medicine. Then they sell them. They had an idea and came to an enterprise: "Do you need it?" They buy it, because they have no time to invent something—they must fulfill the plan.

"The entire concept of scientific and technical progress in the country should be changed radically," Aleksandr Chuyenko says. "From the administrative system of the management of science and technology it is time simply to run to a market mechanism of the management of progress. The old arrangement 'ministry — scientific production association—plant' has become obsolete. We are moving slowly in accordance with it, because we are interested in the plan, not in a new idea. It is necessary to set into motion such a mechanism, in which contract research centers, holding companies, and small enterprises will hold an important place. The present regional scientific production structures should be transformed into independent, extradepartmental formations—associations, joint-stock and leasing associations, firms, and companies, and enterprises, which are interconnected only by a business partnership. Only the independence of enterprises will ensure a breakthrough in microelectronics."

Here they understand: it is necessary to test the concept under specific conditions, that is why they are also suggesting Zelenograd as a testing ground. And here there is also the following very important thing: they are categorically opposed to a model statute on the Soviet technopolis.

"When they carried out the 1861 peasant reform, the tsarist officials had enough sense to envisage five versions—five for Central Russia alone!" says Viktor Mironenko. "We in Zelenograd want to take our own path. For this it is necessary to reject the existing principles of the distribution of the profits of enterprises."

Here everything is coming up against the economic mechanism. Now we are bad husbands of good wives. The state takes the revenues from us and then—from the budget—gives us money "for dinner," "for tobacco,"

"for entertainment," and for "pants," moreover, it goes to the store together with us, selects and buys "clothing," at times without fitting.

The arrangement being proposed in Zelenograd is as follows: to put nearly all the earned money into the development of enterprises, new technologies, the development fund of the technopolis, and the local budget, and to give the state only a certain portion of the profit. In other words, the "husband" wants to live on his own wage, to feed himself, and to dress himself, while the "wife" should maintain order in the house and receive money for the necessary expenses.

Here our obstinate state, which has become accustomed to raking all the money from us, shouts: "How is that?! But what will I live on?" It had gotten into the habit of collecting everything in order then to give all the sisters a pair of earrings each. However, administrator-distributors are not the state. The state is the free and enterprising plant, institute, kolkhoz, farm, and family. If they are wealthy, it, the state, is also rather well off; if they are poor, a bag of money is suitable only for sitting on.

But the state will be able to live quite comfortably on the increasing revenues of the technopolis, on the rubles and dollars, which its enterprises and firms will earn on the domestic and international market. Because Zelenograd understands better than you and me what to buy from the West and what to make itself. With whom to go shares and whom to face with the fact of a monopoly on a product. And it is not necessary to give it, Zelenograd, new billions of rubles. And when our domestic technopolis gets on its feet, this will also be the very hen which begins to lay golden eggs. Then we will also jump onto the racing train of scientific and technical progress.

But who will regulate the development of the technopolis and in no way get by without a head? Quite right. And that is why a nontrivial structure—an Observation Council—has been proposed for the first time in the country. Two chambers are as if envisaged in it. In one there are competent and authorized representatives of the state: the Ministry of the Electronics Institute, the Ministry of Finance, the State Committee for Science and Technology, the State Planning Committee, the military-industrial commission, the state commissions for economic reform and foreign economic relations. So that there would be an opportunity to settle questions locally, without consultations with authorities of different caliber. While representatives of enterprises, the city soviet, and the rayon committee, scientists, and specialists will assemble in the second chamber. Such a council will determine the strategy of development of the technopolis, will provide special conditions of management, will set the tax rates on excess profits, will promote the establishment of mixed domestic and international companies....

Here the somber voice of the inquisitive and ideologically vigilant Realist will probably interrupt us: "What

are you undertaking, comrades? What is this, a third power? A local government? Is this a counterbalance to the soviets of people's deputies? Is this the monopoly of a technocracy?"

Call it what you want. Just do not interfere! Our realists are strong, they are putting spokes in the wheels of the project and are holding up the government decision. It in no way makes sense to them: How it is possible to manage without managing, to give instructions without instructing, to lead forward without a stick, a plan, and personal responsibility? A guiding and directing force—why, of course!—is needed, but it should be in the hands of the specific functionary Ivan Ivanovich.

The concept of Zelenograd is a different one. The Observation Council should not supervise anyone and anything, this is a different set of coordinates: it creates an environment for enterprise and provides market economy relations and the conditions of the existence of science-intensive works, while their responsibility to the state lies in the bankruptcy of ideas or in a breakthrough to electronic progress. The guiding and directing force here is the sensible Law and the ruble (perhaps, the dollar!).

As to Soviet power, in Zelenograd it is also obtaining new opportunities, because the technopolis is also a previously unheard of local budget, which ensures the solution of social problems, and genuine self-management, which does not depend on instances.

Who Will Pull Out the Cart?

The reader has already taken note: one of the people with whom I am speaking is the first secretary of the rayon committee. Thus, Yuriy Ilin is not the party eye, to which we are accustomed, and not an observer of the dreamers of Zelenograd, who have gotten into mischief, but an active and useful participant in the events. First of all he is of the same breed as the people surrounding him: he graduated from the Moscow Institute of Electronic Engineering and worked in his specialty. Later on he was in charge of the organizational department of the rayon committee, then won in the competition with eight candidates and took the position of first secretary. Of course, he shares the progressive ideas, of course, from the very start he undertook with enthusiasm the pushing through of the plan of the technopolis. And he has done much. Here Ilin is the complete opposite of party functionaries, whom we consider not without reason an inert mass of laymen. Ilin is a profession, and then first secretary. Yuriy Vladimirovich reasonably believes that the party functionary is by no means faceless, he is first of all a specific individual, it is necessary to proceed from this.

Thus, the city felt a real return from the ventures of the technocrats back two years ago, when the Doka Center of Scientific and Technical Creativity of Youth took form. It financed an adolescent children's club, helped the youth club for information science, and found money for

a children's rehabilitation center and a children's outpatient clinic; it purchased medicines for the victims of the earthquake in Armenia and allocated more than 100,000 for the Initsiativa Fund. The Initsiativa Fund, in turn, in its starting program proposed to change radically the social sphere of the city. First of all to solve the housing problem. For this the housing being placed into operation in the city is being removed from the departmental framework and is being transferred to one manager—the city soviet. For the present the "card" distribution of housing is aggravating the situation. The lines are not shortening. This is understandable: we are striving to build up reserves of square meters, our law enforcement organs are trying not to allow compensation for living space that is being vacated—it is, after all, free, state living space. The people of Zelenograd see a way out of the situation in the establishment of a housing market and in the provision of a socially guaranteed minimum of it. It, this minimum, is made available free of charge, while above this it is paid for at a commercial, floating rate. They are also including in the payment the amount of compensation to the people, whose space is less than the guaranteed level. This will enable those, who are a little poorer, to accumulate "housing money." Thus, every building is becoming an association of owners of the individual apartments.

The city, which has set as its goal to introduce such an economic life, will undoubtedly be worried about the increase of personnel. The university, at which the humanities, natural science, and scientific and technical schools will be integrated, should train them. These are the plans. While here are the deeds: among the many people the mothers of first graders felt the concern of the Initsiativa Fund, having received on 1 September a paid day off. The enterprises, which are the founders of the fund, helped in establishing at the city Palace of Pioneers a children's television center and an architectural school.

"A solid foundation is being prepared for great social changes," Yuriy Ilin says. "And so is a real point of intersection of the interests of party and Soviet power with the Observation Council."

Thus, Zelenograd enterprises want to become world-class firms. A life comparable to western life will be provided to specialists. It cannot be otherwise: with the broadening of international contacts the danger of a "brain drain" will appear; only a high wage and comfort will make it possible to avoid this. Such is the Zelenograd model, which rejects universality. In other places let them manage their freedom in their own way.

"Well, it is all right," you will say, "when educated and zealous young people dream, it is still possible to believe them, because they also studied for this. But the party and soviet apparatus—where do they fit in?!" Steady! It is necessary to take into consideration if only reality. And it is as follows: Yuriy Ilin is an electronic engineer, while Aleksandr Chuyenko, director of the Doka Center of Scientific and Technical Creativity of Youth, is a member of the rayon committee and a member of the

city soviet executive committee. And both are experiencing pressure both "from the right" and "from the left." The conservatives are crying: "The technopolis is capitalism, it is exploitation and private property!" They are trying to catch the wind in their lifeless sails and are trying to determine by sniffing whether the sausage smells of socialism. The nonformalists are demanding that the city of the future be built by "clean hands," without representatives of "the disgraced totalitarian power"; they declare any attempts at the combining of efforts with it to be "apostasy." They want very much first to do away with the old system, and then to build a happy life on a fresh site. We have already gone through this—in 1917.

In essence, the "right-wingers" and the "left-wingers" are uniting in the common ranks of the opponents of the technopolis. The people with whom I am speaking have opposed cooperation and evolution to confrontation. This, in my opinion, is a constructive thing, a good example. Of course, with a fool, as they say, it is better to lose than to find. But if among the functionaries there were more Ilins, why not pull out the cart of our life together, which had gotten stuck on the edge of progress? Of course, the new economic relations and Zelenograd itself as an environment of free scientific enterprise are closely connected with the progressive political changes in the country and with the firm establishment of democracy.

And we must not in any way miss the chance with Zelenograd—one of the few. The economic reform in the country should be backed by real deeds. And the technopolis is a very real deed.

Find time! While there are such lads who are hurrying. While they have not lost faith and have not become another lost generation.

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Ministry of Geology Indicators Reveal Perestroika Problems

907A0163A Moscow RAZVEDKA I OKHRANA NEDR
in Russian No 1, Jan 90 pp 49-50

[Article under the rubric "In the Collegium of the USSR Ministry of Geology": "The Cost Accounting System: Not Only Pluses"]

[Text] The question of the development of the cost accounting system of the organization of geological prospecting, as well as sectorial scientific research and experimental design work was discussed at a meeting of the Collegium of the USSR Ministry of Geology. The changeover of production and scientific organizations of the sector to the second model of cost accounting, which was begun in 1987 and was completed in 1989, played a positive role in the development of geological prospecting and scientific research work.

The activity of workers and their participation in cost accounting relations and in the formation and distribution of the earned assets increased, labor productivity and the saving of material resources grew, the indicators of the output-capital ratio improved, the administrative and management personnel were reduced, and the assets being allocated for the social development of labor collectives increased significantly (by 1.5- to 2-fold). The time of geological prospecting, scientific research, and design work is being shortened and its quality is increasing.

At the same time the operational analysis of the activity of organizations and enterprises of the sector for nine months of 1989 testifies to trouble in the correlation of the growth rates of the wage and labor productivity. As a whole for the ministry the average monthly wage during this period increased as compared with the same period of 1988 by 13.5 percent. Labor productivity with respect to income increased by 8.8 percent, that is, the growth rate of the wage led the growth rate of labor productivity by 4.7 percent.

In a number of organizations (Arkhangelskgeologiya, Ukhaneftgazgeologiya, Glavtyumengeologiya, Tadzhikgeologiya, Turkmenggeologiya, the All-Union State Institute of the Complex Designing of Industrial and Civilian Buildings and Structures and Objects of Construction of Geological Prospecting Work, ZabNII) a sharp increase of the wage with a decrease of labor productivity occurred. A significant lead of the growth rate of the average monthly wage as compared with the growth rate of labor productivity was allowed (Aerogeologiya, Sevkavgeologiya, Tsentrgeofizika, Tomskneftgazgeologiya, and others).

Although in many organizations of the sector the growth rates of labor productivity lead the growth rates of the average monthly wage, which creates apparent well-being, these rates themselves are causing alarm, inasmuch as they are not being accompanied by the corresponding increase of the efficiency of operations. The highest growth rates of the average monthly wage for nine months of 1989 as compared with the same period of 1988 were allowed: at the VNIIGeolneruda—170 percent, the VNIIGeoinformsistem—166.7 percent, the All-Union Scientific Research Institute of Economics of Mineral Raw Materials and Geological Prospecting Operations—165.5 percent, the Institute of Mineralogy, Geochemistry, and Crystal Chemistry of Rare Elements—161.9 percent, the Central Scientific Research Mining Exploration Institute—158.8 percent, the Neftgeofizika Scientific Production Association—163.3 percent, the Sibgeo Scientific Production Association—142.9 percent, the Tsentrgeofizika Geological Production Association—127.5 percent, Dalgeologiya—125.6 percent, Torfgeologiya—121.9 percent, and Arkhangelskgeologiya—120.9 percent.

The collegium noted that the executives of organizations and enterprises of the sectors had devoted inadequate attention to the operational analysis of the structure of

income, to the distribution of the cost accounting income, and to the conformity to the increase of the remuneration of labor to the efficiency and effectiveness of work during 1989. The executives of scientific research institutes and design bureaus, geological production organizations and enterprises were warned of their personal responsibility for the observance of the required ratio of the increase of the wage and labor productivity. They were ordered to make a careful analysis of the increase of income and labor productivity and to tighten up the monitoring of the stimulation of work.

The statements of the executives of scientific research organizations V.M. Pitserskiy (the All-Union Scientific Research Institute of Economics of Mineral Raw Materials and Geological Prospecting Operations), O.L. Kuznetsov (the VNIIGeoinformatsistem), and I.F. Migachev (the Central Scientific Research Mining Exploration Institute) and general directors Yu.A. Rossikhin (the Arkhangel'skgeologiya Geological Production Association) and B.N. Mozhayev (the Aerogeologiya Geological Production Association) on bringing the level of the remuneration of the labor of workers in accordance with the result of 1989 in line with the productivity and efficiency of the performed work were taken into consideration. The collegium deemed it necessary within the framework of the new concept of the development of the sector to formulate proposals on the improvement of the cost accounting system of the performance of scientific and production operations.

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Academy Working Group Studies Industrial Security Issues

907A0167A Moscow NTR TRIBUNA in Russian
No 3-4, 23 Feb 90 p 14

[Article by Professor V. Yeremenko: "And Again To Catch Up"]

[Text] "Your bulletin at one time wrote about the work of a group of Academician V.A. Legasov, which had begun to deal with the solution of problems of technological safety. What is the fate of this research? Has this research collective not broken up?"

[Signed] A. Reznitskiy

Poltava

Professor V. Yeremenko answers the questions of our reader.

By way of proof I will say: recently as a member of a Soviet delegation I was in Holland, where a meeting of experts—representatives of the IAEA, WHO, UNIDO [United National Industrial Development Organization], and UNEP [United National Environment Program], organizations which are financing the preparation

of a manual on risk management procedures in large industrial regions—took place.

The present concept of industrial safety is different from the one which existed just seven to eight years ago. Now in addition to questions of the assurance of the safety of works themselves the development of systems, which guarantee the safety of the population and the environment, is integrated in it. This, it would seem, simple and natural broadening of the sphere of industrial safety proved in practice to be a fundamentally new, extremely complex, and expensive matter.

And all the same today several countries (the United States, the Netherlands, France, Canada) for the most part have already completed the development of their national infrastructures of industrial safety (NIPB's). In its structure the modern national infrastructure of industrial safety is a three-level infrastructure. The first, top level is the sociopolitical level, at which "The Plan of Emergency Measures" is drafted—first in regions, then in the country as a whole. The work on it—given the optimum organization of the matter—requires on the average two years of skilled work. The middle level of the national infrastructure of industrial safety is "filled" with a set of legislative acts, directives, and standards, which constitute the legal foundation of this infrastructure. The drafting of such a set of documents, as, say, the experience of the Netherlands attests, takes 5-6 years. And, finally, the bottom level of the national infrastructure of industrial safety is a set of methods, means, and automated systems of the evaluation and minimization of the risk of damage in case of industrial accidents and natural disasters. The "working out" of this set requires from three to five years.

I believe that the reader will not be surprised, having learned that the national infrastructure of industrial safety in its present form does not exist in our country. However, to be objective it must be said that as far back as 6 years ago approximately 10 research institutes of various departments began the development of concepts, the structure, and software of the automated monitoring of the radiation conditions on the territory of the Ukraine. But, unfortunately, by 1986 mainly two organizations—the Institute of Nuclear Research of the Ukrainian SSR Academy of Sciences and the union Scientific Research Institute of Instrument Making—were continuing this work. But there is more. The scientific methods research, the correctness of which was confirmed during the "acute period" of the Chernobyl accident, soon was halted, while the corresponding joint research collectives fell apart. With a sufficiently high degree of probability it is possible to assert that the concept of the extradepartmental, what is called "hybrid monitoring of regions," which was developed by these collectives, will not undergo development: today the industrial department has been commissioned to supervise the operations on radiation monitoring with all the ensuing consequences.

The Permanent Expert Group for Large Technological Systems and Industrial Safety, which Academician V.A. Legasov supervised, also engaged in similar work in the intersectoral version. The experts analyzed thoroughly the international experience of that time (the group was established in 1984), compared it with domestic experience, noted the substantial difference between foreign systems and the Soviet system of the training of specialists and managers of dangerous works (and, alas, not in favor of the Soviet system), and drew up an entire "package" of reasonable proposals. But with the death of V.A. Legasov this group also ceased its works.

True, today a number of collectives and organizations, which should engage in the study of some aspects or others of industrial risk, have been established in our country. A large number of very competent scientists, who, however, are not showing any interest in the study of what has already been done by other researchers (the Institute of Nuclear Research, the union Scientific Research Institute of Instrument Making, the group of Legasov), work here. And, hence, at least several years will be spent on "the repetition of what has been covered."

Is it possible in some way to get out of the formed situation?

Without a doubt, yes! And it is possible to explain such certainty by three reasons. First, today the sociopolitical situation in the country is close to ideal for the speeding up of such work. I have in mind the strengthening of the sociopolitical independence of regions and republics, inasmuch as, judging from international experience, precisely an ascending path of the construction of the infrastructure of industrial safety, from local regional infrastructures to the state infrastructure, is optimal, moreover, the latter might also not exist at all. Further, second, today we already have a package of source materials, which generalize the methods of construction of foreign infrastructures of industrial safety, but have not yet had time to forget the negative experience of the above-mentioned attempts at domestic solutions— attempts that were made before society had accumulated the "critical mass" necessary for the understanding of such work. Finally, third, there are now grounds to expect support of the work on the establishment of regional infrastructures of industrial safety from the center. For not by chance was it noted at the first session of the Supreme Soviet that within the Commission for Emergency Situations attached to the USSR Council of Ministers, which oversees on the territory of the country the safety of toxic and dangerously explosive works and works that represent a fire hazard, the assurance of the safety of the population was called a priority task.

And, of course, it is necessary to continue to learn from those who have gone farther than us in the development of national infrastructures of industrial safety. The development of cooperation with UNEP and its APELL Program, as well as the scientific research center of the

Ministry of Housing, Physical Planning, and Environment of the Netherlands seems extremely fruitful. It is possible to use their experience with much success when forming the infrastructure of industrial safety of the USSR.

All right, are we again to catch up? Besides, the rayon, oblast, kray, and republic, which begin earlier, will gain. Statisticians warn—the points, which have been plotted on space-time axes and record serious accidents and catastrophes, are closer and closer in space and are beginning to coincide by months and weeks. Moreover, the pace of such concentration of the space-time risk for the population is objectively increasing and in two to four years will reach according to present forecasts critical values. From this two consequences are possible—"the pose of an ostrich" or infrastructures of industrial safety. More than 30 foreign countries have already chosen infrastructures of industrial safety for themselves. I am certain that today the choice of the group of Academician V.A. Legasov would also be the same.

Technical Advertisements in NTR TRIBUNA

907A0167B Moscow NTR TRIBUNA in Russian
No 3-4, 23 Feb 90 p 12

[Advertisements]

[Text] The Moscow Instruments and Computer Equipment Store and Showroom

Offers software developers (clients) the Norma (Stek-10000) interactive package for the assessment of estimate documents when developing computer software.

The Standard Time Allowances for the Programming of Problems on Computer, which were approved by Decree No 454/22-70 of the USSR State Committee for Labor and Social Problems and the Secretariat of the All-Union Central Council of Trade Unions of 27 July 1987, are the basis of the package.

Description of the Package:

the time of mastering work with the package is less than 1 hour,

full self-documentation and an interactive mode of operation,

the breakdown of labor expenditures by stages of the development of the project,

the calculation of computer operating time,

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the Norma package works on the YeS-1840 and YeS-1841 personal computers, the IBM PC, as well as ones compatible with them, under the control of MS DOS.

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Address of the showroom: 117218 Moscow, Nakhimovskiy Prospekt, 30/43. Telephone inquiries: 129-09-36.

The Minsk Scientific Educational Center of the Algorithm SNPO is starting groups for the training of specialists in the new specialty "The Concepts of Programming in Ada."

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Telephone inquiries in Minsk: 51-80-63, 51-22-33.

The New Plasma Generator, which was developed at Leningrad Polytechnical Institute, simultaneously hardens and applies a wear-resistant thin-film coating from 1 to 3 micrometers thick in an ordinary atmosphere, not in a vacuum.

Such a unit, which was put into operation at the Elektrosila Association, is capable of increasing in a few minutes the durability of parts by two- to sixfold.

Address for inquiries: 195251 Leningrad, Politehnicheskaya Ulitsa, 29, Leningrad Polytechnical Institute, K-05, the Welding Technology and Equipment Chair.

POISK Commentary on February S&T Conference

907A0162A Moscow POISK in Russian No 8 (43),
22-28 Feb 90 pp 1, 3

[Article by Vladimir Oshchenko and Yelizaveta Ponarina under the rubric "The Academy Passes the Examination": "Science at the Turning Point"; first paragraph is POISK introduction]

[Text] All the same we are obstinate people. In no way do we want to learn from the mistakes of others. We aim everything at our own. It seems that the two Congresses of People's Deputies and the many months of work of the parliament have convinced us where matters are being decided more effectively. It is impossible for anything to be discussed properly by an association of 1,000-2,000 people. Everyone thinks and talks only about his own thing and considers his troubles to be primary—he, as they say, endured them, while he does not perceive that keenly the concerns of others. As a result more of an emotional than a competent "mean statistical" opinion, which does not reveal the essence of problems and does not pave the way to their solution, forms.

The first day of the All-Union Applied Science Conference on Problems of the Management of Scientific and Technical Progress, which was held in the capital from 19 to 21 February, left precisely such an impression about itself. The audience by clapping asked several speakers, who had mounted the rostrum ostensibly for the discussion of the concept, which was presented by Chairman of the USSR State Committee for Science and Technology N. Laverov, but in reality engaged in a self-report or complaints of their partners, to leave the stage.

And the discussion in a narrower group, on the second day—during the work by sections—gave rise to a completely different heat of passions, to different thoughts and feelings. They were formed according to interests and occupation, everyone went where he considered it necessary to be. They conducted the discussion by topic, with a thorough knowledge of the matter. Our correspondents looked in at various sections, but today it is a question of the one which had the name "Basic Science: The State, Problems, and Means of Restructuring."

The point is that this theme is particularly close to POISK. Back at the beginning of the summer President of the USSR Academy of Sciences Academician G. Marchuk from the pages of our newspaper addressed to the scientific community the proposal to discuss the urgent problems of the restructuring of science and to search together for means of the increase of the effectiveness of research and the democratization of the life of scientists.

The appeal did not go unanswered. More than 1,000 letters, which often are reminiscent of treatises due to the analysis and recommendations, which are contained in them, arrived at the editorial office and the Presidium of

the USSR Academy of Sciences. To a significant degree they also became the basis of the proposals which were made by Academician G. Marchuk at the section. Here is the essence of his statement.

What is the USSR Academy of Sciences—a public organization or a ministry of science? How will its subsequent development proceed? "We believe," the president said, "that the task of the USSR Academy of Sciences as an assembly of its full members and corresponding members lies not in the ministerial regulation of the activity of subordinate structures, but in the evaluation of the prospects of the development of science, the coordination of research, and expert, forecasting, and analytical activity."

The means of restructuring the Academy is, in the opinion of Guriy Ivanovich, "the steady increase of the independence of institutes and the gradual erosion of the rigid organizational framework, which is paralyzing the development of interdisciplinary research and the interaction of scientific collectives and schools." Academic institutes in the future will become more and more autonomous, while the types of scientific research institutions will become more and more diverse.

Along with large institutes, which, incidentally, it is now possible to split into smaller ones, if the ties among their parts have weakened and are hindering the development of science, small autonomous research organizations should become widespread. Among them are temporary scientific collectives, instrument centers, engineering centers, data banks with information networks, consulting firms....

However, haste in such radical restructuring, just as the granting already today of complete freedom to institutes, will hardly help the matter. Such decisions, if they have been made on the spot, G. Marchuk said, would place basic science in an extremely difficult position. The reason is the lack of a developed market of wholesale trade in instruments, materials, and services and the system of the financing of scientific research, which has remained to this day. "For the free development of scientific institutions it is necessary to have a plurality of funds and sources of the support of basic science. I believe that they should have a state basis, but be different, so that it would be possible to implement the principle of contention and competition. The process of their establishment has commenced."

The structural reforms at the academy should be carried out in unity with the democratization of all aspects of the life of the scientific community. The adoption at the next session of the General Assembly of the USSR Academy of Sciences of "The Principles of the Work of the Academic Institute" will be an important step in this direction. In this document the most general approaches to the activity and to the norms of the life of research

collectives will be specified. The petty tutelage of institutes should be eliminated, the primary collective—the laboratory, the division—should become the basic unit of their economic activity.

Moreover, as the president reported, proposals on the making of changes in the charter of the Academy were discussed at one of the recent meetings of the Presidium of the USSR Academy of Sciences. The existence of an alternative in case of the election of governing bodies of the Academy up to the president, who will receive the right to propose to the General Assembly candidates for the positions of vice presidents and chief scientific secretary, is envisaged. It is planned to enlist the scientific community more extensively in the determination of the candidates for election as members of the USSR Academy of Sciences.

There are no doubts that the radical economic reform is posing pointedly the problem of the efficient material support of science on the part of the state. Science is an independent sphere of public life, and that is why the now fixed view of it as one of the spheres of the national economic is extremely destructive for its future. It is intolerable when the mechanism of the allocation of assets for science looks like a fight for resources and state investments on equal terms with ministries and departments.

"It is necessary that legislative organs would make a decision on what portion of the annual budget can be allocated for the development of science," G. Marchuk said. The qualitative updating of the scientific potential of the country could occur in case of an increase of spending by two- to threefold. This process has already begun—in 1989 the USSR Council of Ministers additionally allocated about 500 million rubles for carrying out the retooling of academic science.

The means of the formation from the investments, which are allocated for the development of science, of a basic research fund and other funds, which on a competitive basis would subsidize scientific collectives regardless of their department affiliation, would be most advisable. It is worth examining the proposals on the establishment of a special economic zone—the infrastructure of basic science, the pilot experimental works of academic scientific institutions and the pilot base of leading universities and higher educational institutions could become its basis.

Unfortunately, G. Marchuk noted, for a long time we devoted too little attention to social science institutes. But there an extremely serious situation has formed. On the eve of the conference I together with Academician V. Kudryavtsev succeeded in meeting with nearly all the departments of social sciences and in outlining together a plan of much assistance to the institutes of the departments. In particular, recently the Presidium of the USSR Academy of Sciences adopted the resolution to turn over its present building for the organization of the Center of Humanities Knowledge, in which it is proposed to locate

the humanities archives, an information bibliographic service, a conference hall, and exhibition displays.

Why did we find ourselves at a dead end? For we remember the profound scientific breakthroughs which are connected with the names of P. Kapitsa, N. Semenov, I. Kurchatov, S. Korolev.... However, the extensive means of development had the result that science to this day is regarded as something second-rate. Lysenkoism, the persecutions of cybernetics scholars—this was terrible. But there were also other, "quiet" blows to science. When the combining of jobs by scientists of the Academy at higher educational institutions was prohibited. And when the government made the decision on the transfer to sectors of 100 academic scientific institutions of the technical direction. As a result there are the break of the ties of the higher school and academic science and the loss of leading positions in the development of machine building technology, chemistry, power engineering, and computer technology.

It is possible to correct the situation, having changed fundamentally the relations of the state and science and having passed legislative acts which regulate scientific activity in the country. First of all this is the Law on State Scientific and Technical Policy, G. Marchuk stressed, in which statewide priorities in the development of science and technology and the responsibility of the state for their implementation would be established. The passage of the Law on Intellectual Property and addenda to the USSR Law on the Unified Tax System, which would specify the condition of the preferential taxation of assets, which are invested in the development of science and scientific and technical progress, is of the greatest importance.

Without these steps one will not overcome the arisen danger. As the president of the USSR Academy of Sciences stressed, under the conditions of the change-over to the new forms of management the tendency for the gap between the sectors of physical production, applied science, and basic research to grow has emerged. Whereas previously in ministries plans of the assimilation of new equipment existed and considerable assets were allocated for this, today sectors are ceasing to invest money in these operations. And it is even the other way round—they are beginning to demand from the Academy payment for the opportunity to bring advanced ideas up to technologies and machines in plant shops.

This can lead to the weakening of the ties with sectorial science, the decrease of the level of developments, and the loss of the coordinating functions of the USSR Academy of Sciences in the development of scientific research in the country.

Of course, you will not correct the situation by pressure methods. A realistic and radical means here is the integration into a single state program of the entire series of operations from research to implementation in practice.

So, we will be frank, hardly anyone expected from the USSR Academy of Sciences such a significant package of proposals. People have grown accustomed to the fact that the Academy dreads drastic changes, any innovations ripen in it for decades. But probably the most surprising thing is that, in appealing for the modernization of science, the majority of speakers all the same noted: In undertaking restructuring, one must not make abrupt sweeping movements, circumspection and the consideration of actions are needed.

After all, for example, the financing of exploratory research today is inadequate. While supplementing by means of competitions and grants, about which much was said, for the present is proceeding well only in words. For there are no guarantees that those, who are more talented, and not those, whose patrons are on the competition commissions, will always receive money. The very members of the commission spoke about this!

In the opinion of Academician D. Knorre, the annual battle for finances forces managers of laboratories to leave their research collectives for a long time. During this time talented young scientists establish contacts with foreign centers—and leave “to do science” there. It is a good thing if it is for years, and not forever. And immediately after entirely “green” young people, who have just come from higher educational institutions, run away to cooperatives, considering it stupid to obtain “knowledge” for 160 rubles a month. It is necessary to combat this legislatively and resolutely. Otherwise the “brain drain” and the disintegrating action of cooperatives will ruin basic science....

Undoubtedly, there is a grain of truth in these words. The situation is alarming. But one will not succeed in coping with it by the principle “hold back and do not let out.” Yes, legal protection is needed, yet not of science, but of the scientist, as Doctor of Physical Mathematical Sciences A. Ilyashevich clearly formulated it.

A researcher first of all needs economic independence. Why expect Nobel Prize winners, when in our country in a year 44 billion rubles are spent on all science as a whole, while in the United States \$128 billion are spent?

More is needed. It is needed. But where is one to get it? For although scientists repeat that society will in no way turn to face them, in the past 2 years the state given the incredible deficit allocated for science 1 billion rubles more than previously—or 6.4 percent of the national income. And, as People's Deputy S. Ryabchenko noted, the people will hardly find the opportunity to allocate more, although scientists actually earn outrageously little.

How is it possible to compensate? If only by the strengthening of the international contacts of scientists, to afford a greater opportunity to associate with colleagues and to get one's fill of information, without which a genuine researcher is as without air. And a second thing: It is necessary to abolish the destructive regime of registration. It is probably most harmful of all for the scientist,

at the basis of whose creativity is the need to work at various scientific centers of the world, especially of his own country. It is necessary to pose more strictly the question of the right of the Academy of Sciences and the State Committee for Public Education to a specific amount of vacant housing for the rotation of personnel. For the present the Academy of Sciences every year transfers to the Moscow City Soviet 8 million rubles for construction on a shared basis, but gets in exchange...two to three percent of the promised living space. If the Academy had housing, it would be possible to increase appreciably both the level of the training of scientists and the level of scientific research.

With respect to money, S. Ryabchenko noted, under the conditions of the period of transition to a market economy it is becoming a tool which organizes scientific work. And it is necessary to handle it carefully.

As a result of the difficult debates they came to the conclusion that with allowance made for the experience of carrying out competitive financing it seems advisable to examine the question of increasing the share of assets for exploratory research. And to release everything given above plus public and special funds for competitions and grants in the priority directions. The former looks like ration cards in case of a shortage, while it is possible to obtain the latter in the competitive struggle for a worthy idea.

As a whole the section participants approved the program, which was proposed by the president, and, having continued the discussion the next day at a round table, formulated in this regard the corresponding recommendations.

Conference Sets Policy for Future S&T Development

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Morning edition p 2

[Article by IZVESTIYA science commentator B. Kononov: “The Concept of Progress. The Reform of Domestic Science and Technology Is Beginning”]

[Text] One of the most conspicuous paradoxes of our country is the glaring discrepancy between the powerful branched and ever increasing system of scientific institutions and the lag behind the world level of practically any sector of industry and agriculture. A fact remains a fact—the 1.5 million man army of scientific personnel of the Soviet Union, the largest in the world, for the present is working inefficiently.

Of course, it is impossible to tolerate this. Therefore, the All-Union Applied Science Conference on Problems of the Management of Scientific and Technical Progress, which will work three days, is opening on 19 February in Moscow in the Hall of Columns of the House of the Union. The organizers of the conference decided not to let matters take their own course, but proposed their concept in advance to the scientific community for

"study at home." The concept of the improvement of the management of scientific and technical progress (NTP) under the conditions of the radical economic reform was not only distributed in advanced to organizations, but was also published in the press.

"The new concept," First Deputy Chairman of the USSR State Committee for Science and Technology (GKNT) I.M. Bortnik told me, "figuratively speaking, is based on 'three whales.' The 'first' is the transition from strict state centralized planning to state-public regulation of scientific and technical progress and the extensive democratization of the entire process of the making of decisions and their implementation. The 'second' is the development in the country of a mechanism of the receptivity of the entire economy to scientific and technical progress. And the 'third' is the formation of legal support of efficient scientific and technical activity. Laws, which are approved by the USSR Supreme Soviet, should succeed all kinds of departmental instructions, decrees, and orders. While the management of scientific and technical progress as a whole should become an inherent component of the integral system of the management of our socialist economy."

Planning, management, and regulation are similar concepts. Will not the content remain the old content in case of the change of terms? Therefore, it is important to look at what methods of treating our "sores" are proposed.

One of the most chronic ones is the actual financing of the signs of scientific institutes, and not specific jobs, which the country needs or which are dictated by the internal logic of the development of basic science. A method of treatment, which is well known and has become firmly established in world practice—goal program planning—is proposed here.

Previously we had about 200 "most important" statewide programs and centralized assets in practice were "spread" over the entire front of scientific and technical activity. Money was allocated to institutes, and not to specific performers, assignments were often not provided with material resources and the necessary equipment. The programs themselves most often of all were put together mechanically from the proposals of institutes and individual scientists—in fact, they themselves wrote down for themselves the assignments and the deadlines of their completion. As a result the programs for the most part were of a token nature.

Now it is proposed to form priorities at all levels—the statewide, regional, sectorial, and subsectorial levels and the level of enterprises. The priorities should be based on a long-range forecast of development, but should be formed by the democratic method of public discussion in scientific and technical and public councils of various levels with the enlistment also of independent paid experts, who would bear legal responsibility for their recommendations.

Now 15 priority state scientific and technical programs have been formulated. Their task is to develop the

directions of a breakthrough, which will play a revolutionary role along the entire front of scientific and technical progress. Here the role of the USSR State Committee for Science and Technology in the implementation of these programs is also changing. Whereas previously, simply speaking, financing passed through it as transit goods and it was simply a stamping organization, now full responsibility to the state is being assigned to the USSR State Committee for Science and Technology. For 1990, 765 million rubles have been allocated for priority programs. And the staff members of the USSR State Committee for Science and Technology should already be entering into contractual relations with the performers of the programs, who provide for mutual responsibility. But wherever other state organizations are more competent, they also carry out financing. For example, the financing of basic research takes place through the USSR Academy of Sciences.

Such a system is envisaged for goal programs of all levels. In the end this should also have the result that not the budget-carried institution, but the research collective, which works under contract on a specific problem, will be the basic unit in science. Practically all jobs should be financing within the framework of projects.

Another ominous "sore" of our science is the monopolism of organizations, the dominating influence of head institutes, and the stifling by established authoritative institutions and schools of alternative directions in embryo. In order to combat this negative phenomenon, parallel orders for important jobs—the same thing that was previously called duplication and was ruthlessly eradicated—are now being proposed. Now competitive jobs should become the rule.

As of 1 January 1990 a special antimonopoly fund was established by a decision of the USSR State Committee for Science and Technology. It is small—20 million rubles were allocated for 1990—but can play a very important role for the support of groups of scientists, which come forth with new ideas that are at variance with the views of established authorities. A special fund of the support of inventions was formed for this year under the State Committee for Inventions and Discoveries. Moreover, a special innovation fund for the support of risky operations, which do not guarantee success, but in case of success promise enormous gains for the state, was formed on the initiative of the USSR Council of Ministers. This fund will be under the USSR State Committee for Science and Technology, but an independent board should manage it. In the future the funds should be replenished by means of deductions from the profit of enterprises.

And, of course, the main misfortune of our science is the notorious barrier of introduction and work "for the shelf." Yet this is not the fault, but the misfortune of scientists. Here the changeover of the country in the course of perestroika, which is under way, from a deficit economy with the universal dictation of the producer over the consumer to a competitive market system

should play a decisive role. Then a real economic basis will appear for scientific and technical progress to become not an abstract armchair "necessity," but truly vitally important progress, which actually governs the prosperity of every enterprise.

As a whole the task of forming an environment, in which both science should be vitally interested in close contact with the national economy and production, at last, would pursue scientific and technical innovations not in words, but in deed, is being posed. The stimulation of healthy enterprise and the possibility of the free joining by any scientific subdivisions of concerns, corporations, associations, consortiums, and other unions, which operate on a joint stock basis, should play an important role in this process of developing the receptivity of our economy to scientific and technical progress. A large group of problems, which are due to the practical absence in the country of a reasonable system of intellectual property and the determination of the norms of deductions from its use, is closely connected with this.

In practice the questions of the formation and functioning of science and technology parks, as well as technopolises, which are already operating in a number of countries, thus far have not been elaborated in our country. At them by means of various benefits scientific and technical, educational, and production units are fundamentally combined and domestic and foreign capital is fundamentally combined with marketing activity, contributing to an avalanche-like increase of the potential and the rapid assimilation of the latest technologies.

If we are really interested in the acceleration of the pace of scientific and technical progress, it is also necessary to strengthen in every possible way and to grant benefits to small scientific production and intermediary firms and cooperations, which deal with the dissemination of the latest technologies.

On the other hand, it is perfectly well known that now the introduction of scientific and technical achievements gives enterprises heaps of troubles and provides too few advantages. Therefore, preferential taxation, which would compensate enterprises for the expenses and would give every worker an opportunity to feel in his own pocket the profit of scientific and technical progress, is necessary. Appearance on the world market and the output of products, which have international certificates, should be stimulated in every possible way. We should gradually join the world economic system—without this there is no future.

At the same time not only a "carrot," but also a "stick" are needed. The consumption of human labor and resources for the production of obsolete, low-quality products should be punished tangibly. And this "stick" should strike an especially painful blow to ecologically harmful works.

The new concept of scientific and technical progress should blend fundamentally with the rule of law state which is now being formed in our country. For the present we have practically no scientific and technical legislation. And the situation should begin to be changed already this year. Among the priority legislative acts are: USSR laws on state scientific and technical policy, intellectual property, the scientific research organization, and the status of the scientist and several others.

We will not try to guess the specific results of the discussion of the problems at the conference, but its general orientation is also clear today. The scientific community wants to see to it that the green light for creativity, the boldness of thought, initiative, and enterprise would, at last, go on in our country. And all those, who hinder progress, impede work, and for years avoid the making of decisions, should in the final analysis bear responsibility in accordance with law for their antisocial activity.

Winners of Lomonosov Prize for Physics, Natural Sciences Announced

907A0169A Moscow IZVESTIYA in Russian 21 Mar 90 Morning edition p 3

[Article: "The M. V. Lomonosov Medals"; first two paragraphs are IZVESTIYA introduction]

[Text] The Presidium of the USSR Academy of Sciences has awarded the M.V. Lomonosov Gold Medals for 1989 to Academician N.G. Basov and Professor H.A. Bethe (the United States) for outstanding achievements in the field of physics.

The M.V. Lomonosov Gold Medals are the highest award of the USSR Academy of Sciences and are awarded annually (one to a Soviet scientist, one to a foreign scientist) for outstanding achievements in the field of the natural sciences.

Academician Nikolay Gennadiyevich Basov (born 14 December 1922) is a prominent Soviet physicist and one of the founders of quantum radiophysics—a field of science, which has had a profound influence on the development of modern physics and chemistry and dictated the revolutionary change in engineering and technology. The constructive ideas and methods, which were proposed by N.G. Basov, led to brilliant successes in the development of current knowledge in this new field of science.

The priority of domestic science in the development of a fundamentally new method of the generation of electromagnetic oscillations by means of quantum systems and in the development of a molecular-beam generator (maser) based on a beam of ammonia molecules is connected with the name of N.G. Basov.

The ideas advanced by N.G. Basov of using semiconductors for the development of optical quantum-mechanical oscillators (lasers) and the obtaining of various types of semiconductor laser were of landmark importance for the development of the new scientific direction.

Among the basic scientific results of N.G. Basov one should name the development of the physical principles of quantum standards of frequency and the study of the processes of obtaining short powerful pulses of coherent radiation.

The idea advanced by N.G. Basov of the possibility of using lasers in thermonuclear fusion led to the establishment of a new direction in the problem of controlled thermonuclear reactions. The first laser unit of the spherical bombardment of targets for thermonuclear fusion was put into operation on the initiative and under the supervision of N.G. Basov.

A significant series of studies of N.G. Basov is devoted to thermal and chemical methods of the pumping of lasers. The idea and the organization and implementation of a set of operations on excimer and electroionization lasers belong to N.G. Basov.

Academician N.G. Basov has made a fundamental contribution not only to the emergence and development of quantum electronics as a new field of science, but also to the extensive application of its achievements in various fields of science and technology. The work of N.G. Basov and his scientific school on the use of lasers in optoelectronics, the detection and ranging of the moon, medicine, and the invention of the laser projection television is well known.

Academician N.G. Basov is a prominent organizer of science and public figure. He is a member of the Presidium of the USSR Academy of Sciences and heads the board of the All-Union Society for Knowledge. For a number of years N.G. Basov was director of one of the most prominent scientific institutions of our country—the Physics Institute imeni P.N. Lebedev of the USSR Academy of Sciences. N.G. Basov is performing much work on the training of young scientists, he heads the Chair of Quantum Electronics at the Moscow Engineering Physics Institute.

The outstanding scientific services of N.G. Basov have world recognition. He has been elected a member of a number of foreign scientific societies and academies and an honorary doctor of foreign universities.

For basic research in the field of quantum electronics N.G. Basov was awarded the Lenin Prize (1959) and the Nobel Prize (1964).

Academician N.G. Basov has been awarded the highest state awards of the USSR: He is a two-time Hero of Socialist Labor and has been awarded five Orders of Lenin.

Professor Hans Albrecht Bethe (born 2 July 1906) is one of the most prominent physicists of our times. The scientific interests of H. Bethe encompass nearly all fields of modern theoretical physics. His works have been devoted to quantum mechanics, solid-state theory, nuclear physics, the problem of nuclear matter, the theory of nuclear reactors, and astrophysics.

In 1933 H. Bethe emigrated from Germany and in 1935 began working at Cornell University of the United States. H. Bethe for a number of years headed the theoretical department of the Los Alamos Laboratory of the United States, where during this period work was performed on the development of the first atomic bomb.

Among the basic achievements of H. Bethe, which became classical long ago, are the construction of the Dayton theory, the obtaining of a formula for the determination of the energy losses of a charged particle during movement in matter, the prediction of inverse beta-decay, the devising of the basis of the cascade theory of the development of showers in cosmic rays, the construction of a statistical theory of the nucleus, and the derivation of an equation that describes the system of two interacting particles.

One of the most important scientific achievements of H. Bethe is connected with his works that are devoted to the problem of the energetics of stars. Relying on the data of theoretical and experimental nuclear physics, H. Bethe indicated the most likely cycles of thermonuclear reactions, which are the source of energy of main sequence stars: the proton-proton and carbon-nitrogen cycles. The subsequent development of these ideas of H. Bethe found expression in the extension of the current notions about the internal structure and evolution of stars and the origin of chemical elements and served as the basis of nuclear astrophysics.

H. Bethe is one of the founders of modern quantum electrodynamics. The idea of the renormalization of mass and priority in the explanation of the Lamb shift of levels as the effect of the interaction of an electron with a radiation field belong to him.

H. Bethe made a substantial contribution to the emergence of a separate scientific discipline—elementary particle physics. The idea of the existence of two different types of mesons and the postulate of the charge independence of strong interactions belong to him.

The outstanding contribution of H. Bethe to the development of physics and his great scientific authority have received the recognition of the world scientific community: He has been elected a member of many national academies and scientific societies and was awarded the Nobel Prize in Physics (1967).

Competitive Themes for USSR State Prizes Selected

907A0184A Moscow IZVESTIYA in Russian 30 Mar 90
Morning edition p 2

[Article: "From the Committee for Lenin and USSR State Prizes in Science and Technology Attached to the USSR Council of Ministers"]

[Text] The Committee for Lenin and USSR State Prizes in Science and Technology attached to the USSR Council of Ministers reports that the following works have been allowed to participate in the competition for the 1990 USSR State Prizes:

1. N.N. Bogolyubov, Yu.A. Mitropolskiy, A.M. Samoylenko, Ye.A. Grebenikov, Yu.A. Ryabov. "The Development of the Foundations of the Modern Mathematical Theory of Nonlinear Oscillations."

Recommended by the Institute of Mathematics of the Ukrainian SSR Academy of Sciences.

2. L.S. Pontryagin. "Basic Research on Differential Games."

Recommended by the Mathematics Institute imeni V.A. Steklov of the USSR Academy of Sciences.

3. I.M. Frank, K.D. Tolstov, F.L. Shapiro, A.V. Antonov, A.I. Isakov, M.V. Kazarnovskiy, V.I. Popov,

A.V. Stepanov. "The Development and Application of Experimental and Theoretical Methods of the Study of the Thermalization and Diffusion of Neutrons."

Recommended by the Physics Institute imeni P.N. Lebedev of the USSR Academy of Sciences.

4. A.D. Akhsakhalyan, S.V. Gaponov, V.M. Genkin, B.M. Luskin, Yu.A. Platonov, N.N. Salashchenko, A.V. Vinogradov, A.I. Fedorenko. "The Development of Multilayer Optics of the Soft and Ultrasoft X-Ray Band of Wavelengths."

Recommended by the Institute of Applied Physics of the USSR Academy of Sciences.

5. Zh.I. Alferov, S.A. Gurevich, M.N. Mizerov, Ye.L. Portnoy, V.B. Smirnitskiy, R.A. Suris, V.I. Kuchinskiy, R.F. Kazarinov. "The Development of the Principles, Basic Research, and the Production of Semiconductor Lasers With Distributed Feedback."

Recommended by the Physical Technical Institute imeni A.F. Ioffe of the USSR Academy of Sciences.

6. S.T. Belyayev, L.M. Biberman, V.S. Vorobyev, I.T. Yakubov, L.P. Pitayevskiy. "The Development of the Theory of the Kinetics of Excitation—Ionization-Recombination in Nonequilibrium Atomic Plasma."

Recommended by the Institute of High Temperatures of the USSR Academy of Sciences.

7. S.A. Akhmanov, N.I. Koroteyev, V.V. Smirnov. "The Proposal and Development of Highly Sensitive and High-Resolution Methods of the Coherent Active Spectroscopy of the Scattering of Light With the Use of Adjustable Lasers."

Recommended by the Physics Faculty of Moscow State University imeni M.V. Lomonosov.

8. G.M. Zaslavskiy, A.B. Mikhaylovskiy, V.I. Petviashvili, M.I. Rabinovich, A.G. Sitenko, N.L. Tsintsadze, V.N. Tsytovich, B.V. Chirikov. "The Development of the Principles of Stochastic Dynamics and the Theory of the Turbulence of Systems of Charged Particles and Waves."

Recommended by the Institute of Atomic Energy imeni I.V. Kurchatov.

9. B.V. Deryagin. "The Development of the Theory of the Stability of Colloids and Thin Films."

Recommended by the Institute of Physical Chemistry of the USSR Academy of Sciences.

10. Yu.I. Yermakov, V.A. Likholobov, F.S. Dyachkovskiy, A.D. Pomogaylo, B.N. Kuznetsov, G.V. Lisichkin, Yu.N. Novikov, V.I. Smetanyuk. "The Development of the Scientific Principles of the Synthesis and Use of Heterogenized Metallocomplexes."

Recommended by the Institute of Catalysis of the Siberian Department of the USSR Academy of Sciences.

11. A.Ye. Shilov, A.A. Shteynman, N.F. Goldshleger, N.S. Yenikolopov, E.A. Grigoryan, Ye.S. Rudakov, I.S. Akhrem, N.F. Noskova. "The Discovery and Development of the Scientific Principles of the Metallocomplex Activation of Saturated Hydrocarbons in Solution."

Recommended by the Institute of Structural Macromolecules of the USSR Academy of Sciences.

12. A.A. Krasnovskiy, N.V. Karapetyan, V.A. Shuvalov, V.V. Klimov, Yu.Ye. Yerokhin, A.V. Klevanik, V.B. Yevstigneyev. "The Explanation of the Molecular Mechanisms of Photobiochemical Transformations of Chlorophylls in the Reaction Centers of Photosynthesis."

Recommended by the Institute of Biochemistry imeni A.N. Bakh of the USSR Academy of Sciences.

13. V.Ye. Sokolov, V.N. Orlov, I.A. Shilov, V.N. Bolshakov, N.N. Vorontsov, I.M. Gromov, L.S. Lavrov. "The Integrated Study of Mammals as the Basis of the Control of Their Number and Productivity (Taxonomy, Ecology, Protection)."

Recommended by the Biology Faculty of Moscow State University imeni M.V. Lomonosov.

14. M.Kh. Chaylakhyan. "The Development of the Hormonal Theory of the Flowering of Higher Plants."

Recommended by the Institute of Plant Physiology imeni K.A. Timiryazev of the USSR Academy of Sciences.

15. N.I. Nikolayev. "The Formulation and Development of the Neotectonic Direction in the Earth Sciences."

Recommended by the Geology Faculty of Moscow State University imeni M.V. Lomonosov.

16. O.A. Bogatkov, V.I. Gonshakova, V.I. Kovalenko, V.A. Kononova, Ye.Ye. Lazko, I.D. Rabchikov, Ye.V. Sharkov, V.V. Yarmolyuk. "The Study of the Evolution of Igneous Rocks of Various Geodynamic Situations in the Geological History of Earth."

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Recommended by the Institute of Atmospheric Physics of the USSR Academy of Sciences.

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Recommended by the 2nd Moscow Medical Institute imeni N.I. Pirogov.

19. B.V. Leonov, V.A. Lukin, Ye.A. Kalinina, V.M. Zdanovskiy, M.B. Anshina, I.M. Gryaznova, A.I. Nikitin, G.A. Savitskiy. "The Development and Introduction of an Outpatient Method of the Treatment of Infertility by Means of Extracorporeal Fertilization."

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1. I.P. Kopylov. "Matematicheskoye modelirovaniye elektricheskikh mashin" [The Mathematical Simulation of Electrical Machines] (Moscow, "Vysshaya shkola", 1987).

Recommended by the Moscow Power Engineering Institute.

2. B.A. Cherkasov. "Avtomatika i regulirovaniye vozduшно-reaktivnykh dvigateley" [The Automation and Control of Air-Breathing Jet Engines] (3rd edition, Moscow, "Mashinostroyeniye", 1988).

Recommended by the Moscow Aviation Institute imeni Sergo Ordzhonikidze.

3. D.A. Kharkevich. "Farmakologiya" [Pharmacology] (3rd edition, Moscow, "Meditsina", 1987).

Recommended by the 1st Moscow Medical Institute imeni I.M. Sechenov.

4. V.I. Ivanov. "Kurs dozimetrii" [A Dosimetry Course], (4th edition, Moscow, "Energoatomizdat", 1988).

Recommended by the Moscow Engineering Physics Institute.

For Secondary Vocational and Technical Educational Institutions

5. I.I. Ishchenko. "Tekhnologiya kamennykh i montazhnykh rabot" [The Technology of Masonry and Installation Operations] (4th edition, Moscow, "Vysshaya shkola", 1988).

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'Secret' Details of Early ICBM, Nuclear Warhead Development Revealed

907A0166A Moscow POISK in Russian No 7 (42), 15-21 Feb 90, No 8 (43), 22-28 Feb 90

[Chapter from book "Korolev" by Yaroslav Golovanov under the rubric "The Portrait Gallery": "Operation 'Baykal'"; first paragraph is POISK introduction]

[No 7 (42), 15-21 Feb 90, p 7]

[Text] Writer Yaroslav Golovanov has completed many years of work on the chronicle "Korolev." POISK has chosen one of the chapters of the future book, which tells about events that until recently were absolutely secret—the tests of the first Soviet long-range ballistic missile with a nuclear warhead.

In spite of the fact that in the opening credits of the movie "The Taming of Fire" script author and director-producer Daniil Khrabrovitskiy vigorously dissociates himself from documentation, the prototypes of the characters are immediately guessed, while Kurchatov, for example, is called Kurchatov, they even glued Kurchatov's beard on Bondarchuk, which did not save the situation, since the actor in life absolutely does not resemble Igor Vasilyevich. Bashkirtsev is, of course, Korolev, Ognev is Glushko, Logunov is Ustinov, and Golovin is Nedelin. The prototypes are documentary, but at the same time a rare film is so saturated with a "beautiful" lie as "The Taming of Fire" is.

After the atomic bomb tests Ognev at the observation point starts an absurd conversation, which is intended, according to the idea of the script writer, to show the humanism of Soviet scientists: "But does the moral aspect not alarm you?"

As they say in Odessa, "they thought too late!" It was too late to ask such questions. But the reply of Golovin is even more ridiculous: "One thing alarms me, how if necessary to deliver all this to any point of the earth!" It is here that they actually "thought too late!"—the bomb already exists, but it is unclear, it turns out, how to "deliver" it. Ognev continues to play the fool, while Golovin does not ask him and Bashkirtsev with a soldier's direct manner the main question:

"Will you make a delivery system? Only without demagogu—yes or no?"

"Yes," the wise Bashkirtsev replies.

"Please, do not speak for me," Ognev continues to act like an idiot.

Some childish conversation is taking place. How could our missilemen, who were not only outstanding designers, but also true patriots, not make a delivery system, seeing the real threat of the transformation of the "cold" war into a "hot" war?! What professional, moral, and civil right did they have to decline such an assignment? And what thoughtless people the high executives

of the defense industry and the army look like here, if they pose like that, on the go, in the bunker, a task which is most important for the fate of the country and determines the very possibility of its further development!

The fact that a missile with a nuclear warhead would be a fundamentally new weapon which destroys all previous offensive and defensive doctrines, was clear immediately after Hiroshima. They knew what it was necessary to do. The whole question was how to do this. More precisely, there were two questions.

On 25 September 1949 TASS reported an explosion which had occurred significantly earlier: at noon on 29 August. In two days an American B-29 "Flying Fortress," which had completed an ordinary flyover of the Soviet borders, returned with spoiled film. Experts determined the cause: radiation. On 23 September Truman informed his countrymen of the atomic explosion in Russia. Only after this did Stalin give instructions on the publication of the TASS Communiqué.

The bomb, which was detonated on a metal tower, was still far from perfection, was heavy and bulky. Therefore, the first question, which it was necessary to settle, was to make the nuclear warhead as compact and light as possible.

The second question is the development of as powerful as possible a delivery vehicle, which is capable of carrying this warhead as far as possible. Both questions were most closely connected: here is the weapon, which it is impossible to make lighter, the physicists said; here is the missile, which it is impossible to make more powerful, the missilemen said. Their works should have intersected at one point, having developed a nuclear missile shield of the country. All the works of Korolev from the beginning of his work at Podlipki until 1957 were subordinate to this task.

In early October 1953 Sergey Pavlovich found a week to vacation with his wife, Nina Ivanovna, in Garga and again returned to the test range in Kapustin Yar. He had prepared for a new series of tests of the R-5 missile, when Ustinov called M. Yangel, chief of the scientific research institute (of which the design bureau of Korolev was a part), and said that it was necessary to receive "people from Vyacheslav Aleksandrovich"—the atomic bomb experts of Malyshev.

Korolev found out about "the people of Vyacheslav Aleksandrovich" on the same day that Vorontsov brought them to his division. Incidentally, this was one of the few absolutely mandatory requirements of Sergey Pavlovich: he should learn everything, which happened at his special design bureau in all the divisions, at the test range, and on the stands, only from his own people. If Ustinov, Keldysh, or Glushko reported to him something, which he did not know about his own affairs, he usually tried, as far as this was possible, to conceal his ignorance, but the subsequent dressing down of the late informant was inevitable and severe.

This time Korolev had learned everything in time.... He did not leave the atomic bomb experts until the end of their work—he explained, sketched, and led them about the shops.

After the completion of the work they organized a conference. Malyshev, Deputy Chairman of the Military-Industrial Commission Pashkov, Rudnev, Ustinov's deputy for missile affairs, Korolev, Vorontsov, several designers, and "the people of Vyacheslav Aleksandrovich" at full strength attended....

There were many questions for the missilemen. And from what these questions were and how they were asked Korolev quickly understood that Malyshev was an "enthusiast," while Pashkov was rather a "doubter." The slowness of Pashkov began to irritate Malyshev.

"Understand, Georgiy Nikolayevich," he pestered Pashkov, "if you and I do not make a decision, no one will make such a decision for us 'upstairs'...."

Vyacheslav Aleksandrovich was correct: "upstairs" they had a very vague idea at that time of what nuclear weapons were. This can be seen well from the example of the first hydrogen bomb test, which took place approximately two months before the conference with the missilemen.

After appointing Kurchatov supervisor of the nuclear program, Stalin entrusted him to the concerns of Beria, and Lavrentiy Pavlovich did not allow any of the leaders of the country close to this program. The atomic bomb experts could not act over his head—he would immediately put a stop to such independence—and did not want to: Lavrentiy Pavlovich had taken on his powerful shoulders a considerable number of their organizational and economic concerns. After the death of Stalin in early march and the arrest of Beria in late June 1953 the atomic bomb experts were truly "orphaned." Lavrentiy Pavlovich, as a rule, was present at all the crucial tests, but now it was necessary to conduct the first test of the just developed hydrogen bomb, and there was no chief, and no instructions on this account were received. Quite a few lucid minds: Kurchatov, Sakharov, Khariton, Shchelkin, and Zeldovich, Minister Vasilevskiy from the army, and Deputy Chairman Malyshev from the Council of Ministers, had gathered at the test range, but no one knew what to do. Everyone, however, understood that the forthcoming test was not only a scientific and technical, but also a political act and one must not display independence here. Malyshev and Kurchatov flew to Moscow.

When Malenkov heard from them about the test being prepared, he was extremely surprised: the first person in the state did not know anything about any hydrogen bomb. Georgiy Maksimilianovich called Molotov, Voroshilov, and Kaganovich, but they also clearly knew nothing, so, they "had chanced to hear." And, besides, the others did not have time for the bomb: far more important events had shaken the top levels of power. Malenkov had to decide what to do: he no longer had

anyone to ask. After a short conference permission for the test was received. (The success was complete and surpassed the boldest expectations. Malyshev gathered all the specialists and congratulated them on the triumph. When everyone had disperse, Vyacheslav Aleksandrovich recalled that he had congratulated everyone, except the main hero of the day—Sakharov. Unusual embarrassment resulted. Malyshev again gathered all the atomic bomb experts and gave a speech in honor of Andrey Dmitriyevich. A few weeks later, having bypassed the stage of corresponding member, the 32 year old Sakharov was elected a full member of the USSR Academy of Sciences and received his first Gold Star.)

From this example it is evident that Malyshev could hardly have hoped to receive any orders from above, on the contrary, they expected the initiative from him, he should have, speaking in the bureaucratic jargon of those years, "come with proposals." While his proposals reduced first of all to fitting out the R-5 missile with a nuclear warhead, then to attempting to do the same thing with the R-11 missile, and to conducting work on a large missile with allowance made for the possibility to mount on it a hydrogen bomb.

The atomic bomb experts disappeared like ghosts behind their impenetrable Arzamas fences (entire divisions of internal troops guarded them) and there began to prepare a nuclear "head" for the new "five." The development of the warhead section for the R-5 missile, given the fact that a nuclear warhead of appropriate size already existed, was assigned directly to two engineers: Aleksandr Petrovich Pavlov and Vladimir Konstantinovich Lilye. They received from Korolev precise drawings of the front-end fairing, under which they could be clever to their heart's content, within the limits, of course, of a reasonable weight, which completely suited them and over which, as they say, they did not get a headache. Their task: to adapt the bomb to the missile.

Korolev required the missile to be adapted to the bomb. This was extremely vital work. How many different fantastic little books have been written (mainly not in our country) about how as a result of some fatal errors, incorrectly understood commands, and even insanity, which overcame fliers, the dreadful bomb payload was aimed not where it needed to be and what monstrous consequences this had (more often, could have had, inasmuch as a happy ending was always more preferable). But bomber aircraft with experienced, repeatedly proven reliable people, who, of course, could have suddenly gone crazy, although the likelihood of such rapid insanity was all the same incomparably less than the likelihood of interference in the missile guidance system, flew there.

In beginning the work on the machine that was intended for the nuclear warhead, Korolev immediately understood that this should be a fundamentally different machine. Externally this would be a copy of the R-5, with the same motors, but the flight control and guidance

system of this missile should be changed radically. In its reliability the R-5M—modernized—should be a missile of a different generation.... The R-5M was the first missile of Korolev, in which the duplication and even the triplication of several most critical systems was used. The work on their development was performed in an incredibly short time—in approximately a year.

The atomic bomb experts meanwhile developed Kapustin Yar. Test range chief General Voznyuk allotted them about 40 kilometers from the launch pad a parcel of land, on which the construction of area "4N"—the protected and inviolable territory of the atomic bomb experts—was begun. Within it, surrounded by a barbed wire fence with towers, in which submachinegunners sat (this silhouette became simply symbolic for Russia, like the white birch tree) two DAF's¹—service buildings—were built. The first building—the "clean" building—was designed for all operations connected with the automatic equipment and design of the warhead device, the second building—the "dirty" building—was designed for work with the weapon itself, which should have been stored in an underground bunker, as in a fairytale—under seven locks—and nevertheless be checked daily (!) without fail by two (!) people in accordance with a specially developed ritual.² Accommodations, a shower room, a dining room, a movie hall, and recreation rooms were located there, at area "4N"—the atomic bomb experts attempted, wherever possible, to set themselves up with all conveniences, avoiding the tent stages, Lavrentiy Pavlovich accustomed them to sparing no money, which, most likely, is correct, inasmuch as all temporary structures in the final analysis cost more....

Footnotes

1. I have not succeeded in revealing the secret of this abbreviation, no one can explain it to me. The most likely origin of this name is the first letters of the surnames of the leading specialists in the area of nuclear weapons development: Dukhov—Alferov—Fishman.

2. The many, truly ritual rules, which are unknown in other fields of technology and production and were introduced during the years of the development of nuclear weapons, the goal of which is the repeated checking and monitoring of all operations on their storage and loading, may seem excessive, but they completely justified themselves, having enabled our atomic bomb experts to avoid many fatal errors and catastrophes.

[No 8 (43), 22-28 Feb 90, p 7]

[Text] The construction battalions of Voznyuk should have erected the DAF's by September 1955. In May Aleksandr Petrovich Pavlov, who had to settle down soon at area "4N," came to the test range in order to see how things were going. When together with Voznyuk they toured the construction sites, it became clear to both that September was an absolutely unrealistic deadline. Pavlov suddenly proposed a solution.

"Could you not, Vasily Ivanovich, by using your authority in the Ministry of Defense, get permission for the early discharge of the enlisted construction personnel if they turn over the facilities on time?" Aleksandr Petrovich asked.

Voznyuk immediately appreciated the proposal of Pavlov and without difficulty got permission for early discharge. After this the enthusiasm at the construction site reached unprecedented heights, they also worked at night, having turned on spotlights and having attached flashlights to their chest. By September area "4N" was ready....

In the middle of August 1954 Korolev conducted the third series of flight tests of the R-5 obviously with the aim of its modernization.

The work initially proceeded without the participation of the atomic bomb experts—the missile itself was actually developed. In the fall, when area "4N" was occupied, the work became common.

The nuclear warhead as such did not need additional tests: if all the automatic detonation equipment operated properly, it could not but explode simply in accordance with the laws of nature. Consequently, this automatic equipment itself, the "nuclear detonators," and the firing mechanism required checking and tests. Pavlov and Lilye also dealt with this as such, but by the time of the tests they had transferred Vladimir Konstantinovich to another job, while Pavlov remained alone at Kapustin Yar together with a dozen of his lads, of whom Vladimir Petrovich Buyanov was his closest assistant, who had devoted much effort to this work. Their task was many-sided. First, the operation of the automatic equipment precluded the possibility of the detonation of the weapon at launch. The bomb should have been armed already in flight. But since no one could provide a 100-percent guarantee that the missile would flight where it needed to, the bomb should have been armed not simply in flight, but only directly over the target, on reentry, when it was already clear that it had arrived where they had sent it....

Second, all this automatic equipment should have stood up to all the conditions of missile flight: the vibrations and G forces at launch, then the new G forces, which increase on reentry to a very substantial value, and with aerodynamic heating. Now they began to check: what works, what does not work, what stands up, what does not stand up.

It is hardly necessary to explain that all this work was performed under the cover of absolute and strictest secrecy with the introduction of the maximum conditions of classification. Even in Kapustin Yar—the most secret facility—hardly anyone knew about the existence of area "4N" and even fewer knew with what they were busy there. A special state security subunit, which was not subordinate to the command authorities of the test range, guarded the area. Except for Voznyuk and Korolev, no one had a pass to the area. Kapustin Yar

even had an imaginary address: "Moscow-400." During tests all unofficial communication was halted altogether.

Back in the 13th century the famous alchemist Albert the Great, Count von Bolstedt derived a formula which became for all services of the regime the basic guide to action: "There is no other way to keep a secret than not to increase the number of people who have been let in on it." The formula is a wise one, it is actually impossible to devise anything more effective. Beria simply locked up the atomic bomb experts: special permission was required to leave the zone, the entry of any outside, temporary people, even close relatives was ruled out altogether. The missilemen lived a little easier: Podlipki was not a part of any zone. But numbered people knew about the work of the missilemen with the atomic bomb experts at the special design bureau of Korolev. It was also the same way at the special design bureau of instrument maker Pilyugin—they knew that they were modernizing the "five" and were increasing its reliability, but for what and why? So that it would be more reliable!—here is the entire answer for you.

In the summer of 1955 and in early 1956 Korolev conducted 28 launches of the future "nuclear missile." The nuclear device in the post-boost vehicle was replaced by a massive steel slab marker, which preserved, even when burying itself deep in the earth, traces of the explosions of the detonators, from which it was quite easy to determine the efficiency and quality of the operation of all the automatic equipment of the warhead. They dug the slab from the crater at the site of the fall of the missile, carefully wrapped it with a tarp, and delivered it to area "4N," where Pavlov with his engineers very carefully removed the dirt from it, wiped it with alcohol, and oiled it, so that it would not rust. And then they "read" their slab and compiled a record of the tests. Was it possible to call the results of these tests reassuring? For the atomic bomb experts, certainly. The slab told that all their equipment was working efficiently.... For the missilemen, in part. True, of the 28 missiles in the boost phase, when the motors operated, only 1 exploded, and, what is very important, they quickly made out why it has exploded. But there were failures to reach the target....

On 11 January 1956 the classification launch of the R-5M took place without incident. Everyone cheered up, but not for long—they understood: the hour of tests with a real nuclear warhead was coming.

In February the quartermasters of Voznyuk ran like scalded men: the big authorities had come down, it was necessary to worthily house and feed everyone and to provide them with transport.

Pavel Mikhaylovich Zernov was appointed chairman of the State Commission. The first atomic bomb was made under his authority in Arzamas. After its tests in 1949 he supervised the production of the first series of five bombs. When in 1950 they began to test one of these first

series-produced bombs, it did not explode. Zernov collapsed of a heart attack. At that time a cardiology professor, who, incidentally, to the end of his days never found out where, strictly speaking, they had taken him, was admitted to the zone.... Leading atomic specialists: Anatoliy Sergeyevich Aleksandrov (not to be confused with Anatoliy Petrovich!), Yevgeniy Arkadyevich Negin, and other "fathers" of the bomb, arrived together with Zernov.

Marshal of Artillery Mitrofan Ivanovich Nedelin, who was appointed a year later as deputy minister of defense for armaments, represented the army—the main client—in the State Commission.

Together with Nedelin his chief "missile generals": Aleksandr Grigoryevich Mrykin, Vasilii Ivanovich Voznyuk, and Petr Alekseyevich Degtyarev, sat on the State Commission.

Ustinov, Vetoshkin, and Korolev were included from the Ministry of the Defense Industry on the State Commission. All the Chiefs—allied suppliers from various ministries: Glushko, Pilyugin, Ryazanskiy, Barnin, and Kuznetsov—were also there.

A few days before the launch Zernov invited all the members of the State Committee to area "4N." They walked among the DAF's, marvelling at the cleanliness and order. In one of the rooms Zernov detained the entire group.

"But now I would like to show you what should fly away from here"—with these words he threw open the doors to the neighboring room. In the bright beams of invisible lights something incomprehensibly spherical lay on a shiny metal stand.... Everyone froze at the doors, examining the bomb....

During the period of preliminary launches Korolev quite often had launch delays, and not only the fact that this happened, but also the fact that it was necessary to report this to the atomic bomb experts, since the work schedule had been precisely coordinated, was unpleasant. While to report meant to demonstrate the imperfection of his equipment. And now Korolev wanted very much that all the preparatory portion of his work would come off without strain on the nerves, delays, and incidents, therefore, he spent days and nights together with the other Chiefs in the installation and testing building, monitoring each step of the prelaunch preparation and nipping in the bud any possibility of the occurrence of delays. The preparation of the missile, transportation to the launch pad, and all the prelaunch operations went off strictly according to schedule. And what is surprising, the atomic bomb experts forced everyone to worry at the very last moment....

In the dead of night, already after the mating of the post-boost vehicle of the missile with the nuclear warhead, a few hours before the launch Vladimir Petrovich Buyanov, who was on duty at the console, detected a drop of the temperature in the post-boost vehicle of

missile.... He woke Zernov up and told him of his observations. Zernov immediately called all the members of the State Commission to the launch site.... While everyone was gathering, Buyanov reported that the drop of the temperature had stopped and the needle on the console had begun to near the norm. They began to discuss whether it was possible to conduct the launch, if the warhead all the same had been for some time in a "nonestablished regime." With allowance made for the weight of the bomb, the heat capacity, and the time of the drop of the temperature it turned out that it had not had time to cool off. The decision was unanimous: to conduct the tests.

Many days later Voznyuk admitted to trusted people that, while passing at night close to the launch pad, one of his officers noted a pulled plug in the connector of the electric heater, secured it, and reported to Voznyuk. It was unknown whether it had slipped out itself or whether any of the launcher crewmen had pulled it out by some clumsy movement, but Vasilii Ivanovich decided to keep quiet in the State Commission, understanding that you would no longer help the matter, while members of the special section would rush to this connector like vultures, and such a general test range shakeup would begin that it would no longer be possible to work....

The execution of the decision of the State Commission was delayed, however, due to weather conditions: in Kapustin Yar there was a sunny frosty blue sky, but low clouds hung over the nuclear test range, over which they should have shot. There was bad weather for 2 days. Korolev became a complete nervous wreck and totally lost sleep....

To the surprise of everyone Zernov fixed the launch. All the members of the State Commission went to the observation post, about 6 kilometers from the missile. Besides the launcher crewmen headed by Voskresenskiy only Korolev, Pilyugin, and Pavlov remained in the bunker....

The launch took place exactly on schedule. The missile was quickly concealed from the eyes in the low clouds. On the ground there was intermittent rumbling for a long time yet, as always happens when a sound wave is blocked and pulsates between the ground and clouds.

The observers at the nuclear test range did not see the missile. Suddenly something tiny and very bright flashed for an instant, the blast wave ran like circles over water, and the fire column rushed upward, drawing into it everything around so as, having risen, to turn black all at once, spreading the cap of the terrible mushroom.

The telephone report from the test range was terse:

"We observed 'Baykal'"—that is how this launch was coded.

Korolev climbed from the bunker and threw open the steel door to the world. The world was beautiful. The clean snow-covered plain ran in all directions without end and edge. The smoke at the launch pad had already dispersed. God, is that really all?

On 20 February 1956 a Soviet nuclear missile weapon was thus tested for the first time.

New Textbook on Mathematical Analysis Reviewed

907A0133A Kiev RADYANSKA UKRAYINA
in Ukrainian 10 Oct 89 p 1

[Review by M. Shkil, corresponding member, USSR Academy of Pedagogical Sciences, doctor of physical and mathematical sciences, M. Zhaldak, candidate of physical and mathematical sciences, and T. Kolesnyk, candidate of physical and mathematical sciences, of the textbook "*Matematicheskii Analiz*" "An Untraditional Textbook"]

[Text] The Vyshcha Shkola Publishing House recently released a three-volume textbook, "*Matematicheskii Analiz*" [Mathematical Analysis], written by I.I. Lyashko, O.K. Boyarchuk, Ya.G. Gay, and O.S. Kalayda. It is based on the latest scientific and methodological achievements of domestic and foreign mathematics and corresponds to the world standard of development in mathematical analysis, which promotes the deep and full study and mastery of mathematical analysis.

The untraditional interpretation of the material draws attention: the authors eliminate the separation between mathematical and functional analysis, hitherto evident in educational literature. In this regard, they succeed in achieving fullness, universality, fundamentality and, in addition, compactness in setting forth the contemporary course of differential equations.

The textbook also includes new scientific facts. For instance, it offers a new approach to formulas for the substitution of variables in differential expressions for vector argument functions, and it examines exclusion methods and stability theory for explicit equations of random summary order. A number of new, successful methodological techniques were found for explaining the theories of bounds, of implicit functions, of integral numeration, and so on.

The theoretical material is accompanied by well-presented graphics and is masterfully illustrated with skillfully chosen, interesting examples and exercises that foster a deeper understanding and mastery of the postulates of a given theory and instill in students the fundamental knowledge, skills and abilities necessary for well-reasoned thought and the practical application of mathematical analysis methods.

This work is truly a new type of textbook. On the one hand, it can be viewed as a kind of encyclopedia for the theoretical principles of contemporary mathematics and,

on the other, as a scientific and educational text for the higher mathematical level.

It should also be noted that the textbook was written by authors who themselves have made significant contributions to the development of contemporary mathematical analysis, mathematical physics and computer mathematics, and who have practical experience in teaching at VUZs [higher educational institutions].

The textbook has been extensively tested in universities, pedagogical and polytechnical institutes and other VUZs. It has proven to be suitable for in-depth study and further broad application in the teaching process of higher education. Considering the urgent problems of developing and restructuring VUZ education in our republic, it would be desirable to republish the textbook in a Ukrainian version.

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41

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